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ABSTRACT

A study was undertaken to describe and document the dental school dental delivery system using an integrated systems approach. In late 1976 and early 1977, a team of systems analysts and dental consultants visited three dental schools to observe the delivery of dental services and patient flow and to interview administrative staff and faculty. Although the schools visited were selected to be reasonably representative, they do not constitute a statistically significant sample. Based on individual site-visit reports, information was synthesized to form a composite dental school dental delivery system description. Contents of the report are as follows: historical information on the dental school delivery system and information on the schools visited; a broad systems overview of the composite system and the components that make up the system; a discussion of the major characteristics of the system (organization, funding, services, effectiveness, efficiency, and quality assurance); and discussion of each element of the delivery system and of the flowchart that describes the composite system, as viewed from the perspective of the patient. Appendices include: the flowchart describing the patient flow through the system, examples of some typical patient record forms, a tabulation of clinic fees, and a bibliography. (SW)

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ED172695

DESCRIPTION AND DOCUMENTATION OF THE DENTAL SCHOOL DENTAL DELIVERY SYSTEM

Prepared by:
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HEALTH MANPOWER REFERENCES

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We would like to express our appreciation to Gerald A. Jouriman, Project Officer, for his support and assistance in overall project direction. We also wish to thank Tullio Albertini, D.D.S., William U. Talbott and Howard Kelly, D.D.S., of the Division of Dentistry for their interest and guidance throughout the study.

We are grateful to Joseph L. Bernier, D.D.S., M.S., and Stanley S. Cohen, D.D.S., dental consultants to the project team, who offered valuable background information and suggestions in the data gathering phases of the project. G. H. Timke, D.D.S., Research Analyst, American Dental Association, also provided considerable assistance in locating literature pertinent to our study.

Lastly, we are pleased to acknowledge the Deans, faculty members and administrators of the dental schools visited, who generously gave their time and shared with us their professional knowledge. Although these schools and individuals are not identified in this report, their contributions to this project are substantial.

Martin N. Chase
Project Director

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PREFACE

This publication contains the results of a 20-month contract awarded on June 21, 1976, to thoroughly analyze, describe and document the dental school dental delivery system using an integrated systems approach. The intent of the project was to gather baseline knowledge concerning the operation of the dental school dental delivery system, not to propose an "ideal" system.

In late 1976 and early 1977, a team composed of system analysts and dental consultants visited three dental schools to observe the delivery of dental services and patient flow through the schools. To supplement this information, the teams conducted extensive interviews with the administrative staff and faculty of the schools to assure that all facets of their delivery systems were fully documented. Sites were chosen on the basis of variation in the size of cities in which the schools are located and willingness of the school to cooperate since the visits would require effort on the part of the school administrators. Other possible criteria were not utilized as uniformity of standards governing dental education minimizes variation in the nature and quality of services performed and in statistics such as number of patient visits per student per year. The schools selected were not intended to constitute a statistically valid sample and no attempt has been made to extrapolate from them to the universe of U.S. dental schools. The names and locations of the study sites have been protected to assure total anonymity.

It is significant to note that only by understanding the total dental delivery system and its operation can a meaningful dental planning strategy be evolved which is responsive to the needs of all parties concerned: the provider, the profession, the patient and the dental educational institutions. The use of systems analysis to describe the delivery systems of the U.S. will assist materially in establishing valid planning criteria to assure effective delivery systems design and the consequent development and dissemination of recommendations concerning future delivery systems.

This system description and documentation was prepared by Chase, Rosen & Wallace, Inc. under the guidance and direction of the Delivery Systems Branch, Division of Dentistry, Bureau of Health Manpower. The findings of this study are those of the Contractor and do not necessarily represent the position of the United States Government. The Division of Dentistry Project Officer was Gerald A. Joiremen.

EXECUTIVE SUMMARY

This summary presents the highlights of the final report on a study undertaken to describe and document the dental school dental delivery system, one of 19 such systems that have been identified.[1] The phrase "dental school dental delivery system" denotes the universe of all U.S. dental schools, however, there is no implication that all dental schools deliver dental services in the same manner.

In order to develop a factual and representative description of the dental school dental delivery system, a team of systems analysts and dental consultants visited three dental schools. During these site visits in late 1976 and early 1977, clinic operations were observed and detailed information on the delivery of dental services was obtained from faculty and administrative staff. Although the schools visited were selected to be reasonably representative, they do not constitute a statistically significant sample, and no attempt was made to extrapolate from them to the universe of U.S. dental schools. The report summarized here presents a composite description of the way in which patients received dental services at the schools selected during the time period in which the site visits were made.

For the purposes of this study, the dental delivery system associated with a dental school is defined to consist of the dental services delivered by students under the supervision of licensed dentists in all of the clinical facilities of the school. Hence, for example, the delivery of dental services by students under preceptorship programs, and by faculty members in extramural or extramural practices, were not considered to be a part of this system.

The study methodology consisted of a search of relevant literature, development of a protocol for the site visits, visits to the three selected schools, synthesis of all information gathered to produce the composite system description, and, finally, preparation of the final report.

The search for existing literature did not reveal many documents relating directly to the delivery of dental services by dental schools. However, a number of references on subjects of significant background interest were found.

Early in the project, a protocol was developed which described the approach to be followed in conducting the dental school visits and gathering data for the dental delivery system description. Discussions with dental consultants to the project and local dental school faculty members strongly indicated that specific characteristics of the dental school, such as length of program, organization, size and location, are not likely to significantly affect the substance of the dental services delivered, although they may affect administrative details. Uniformity of standards governing dental education minimizes variations in the nature of quality of services performed by dental students.

Three dental schools were selected for visits by members of the project team. The Dean and faculty members at each of the schools were very cooperative in describing the dental school dental delivery system and in providing supplementary materials and information to the project team. Following each visit, a report was prepared which described the observed dental delivery system and depicted patient care in the form of a detailed flowchart.

After the contents of these individual site visit reports were corroborated by the schools involved, the information was synthesized by the project team to form a composite dental school dental delivery system description. The resulting composite system, based on the three schools visited, a detailed flowchart of the delivery of dental care in a dental school clinic, from the patient's point of view, and a narrative explanation of this flowchart, are included in the final report.

The final step in the conduct of this project was the preparation of this Executive Summary and the final report. The format and outline of the report were specified by the Delivery Systems Branch, Division of Dentistry.

In order to place the dental school dental delivery system in perspective, Chapter II of the report presents pertinent background information. Over the past 26 years, the numbers of dental schools and dental students have both increased, in large part due to the Health Professions Education Act of 1963.[2] In each of the dental schools visited, it was noted that applications for admission exceed the established limit.

[1] *Dental Delivery Systems Terminology*, Public Health Service, Bureau of Health Manpower, Health Resources Administration, U.S. Department of Health, Education, and Welfare Publication Number (HRA 6) 77-6.

[2] Feldstein, Paul J., *Financing Dental Care: An Economic Analysis*, Lexington Books, Lexington, Massachusetts, 1973, p. 110.

The increase in the number of dental students, and hence practicing dentists, during this time period has kept pace with U.S. population growth. As a result, the ratio of population to active civilian dentists has remained about the same. (See the final report for more detail and data sources.)

Educational considerations dictate that the dental school clinic must have patients to provide opportunities for the students to obtain experience in the delivery of dental services. Since students must attain proficiency in a number of procedures, both sufficient numbers of patients and a suitable variety of dental conditions are required in order for students to achieve that proficiency. Although there are a number of factors which would tend to discourage an individual from using a dental school clinic, no major difficulties were experienced by any of the schools visited in obtaining enough patients to carry out clinic operations. The only concern mentioned was that some types of dental problems are not presented as frequently as would be desirable from the educational point of view.

Chapter III of the final report describes the dental school dental delivery system in terms of five system components – input, processing, output, constraints, and feedback[1] – and two factors – environment and control – all of which influence system performance. The relationships among system components are also identified and defined.

Chapter IV of the final report describes the dental school dental delivery system in terms of major system characteristics: organization, funding, services, effectiveness, efficiency and quality assurance. Since the dental delivery system is embedded within a dental school framework, discussion of these characteristics refers to the larger context when appropriate.

Dental schools are typically organized by subject matter areas under a Dean who reports either to an overall medical center or biological sciences Dean, or directly to the President of the college or university with which the dental school is associated.

The dean's clinic within a dental school is a facility which is shared by all students and academic departments as a workshop for the practice, demonstration and application of the procedures and techniques taught within the school. One of the senior dental school faculty members is appointed to a supervisory position, with a title such as Dean for Clinical Services. Though departmental responsibilities for technical aspects of clinic operations may be retained, the Dean has administrative control over the clinic and manages its operation.

Each department establishes minimum requirements in its field, including clinical experience and proficiency, and coordinates its needs with the Dean for Clinical Services. This coordination is to insure that clinical facilities are adequate, that students can be scheduled for reasonable clinic hours, that patient supply is sufficient to meet the educational requirements of the dental students, and that proper levels of equipment and supplies are maintained.

A dental school dental delivery system may be funded in a number of different ways. The overriding determinant is the nature of the funding base for the university or college of which the dental school is a part. Private institutions have endowments, receive tuition payments, contributions, and fees for services rendered, and seek additional financial support in the form of Federal funds and grants for special programs. State-supported universities, such as the three schools visited, receive State funds as well as private endowments. It was observed that the proportion of the dental school budget composed of monies from each of these sources varies from one school to another, and within the same school, from year to year. Funds for operation of the dental delivery system are allocated within the overall dental school budget, essentially as an overhead budget item – part of the cost of teaching dentistry.

The dental delivery system is a source of funds for the dental school or university. Depending upon how the system costs are allocated, revenues received for the services provided to patients by students usually cover the costs of materials, supplies, leased space and equipment and administrative overhead.

Services provided by the dental school dental delivery system cover all of the basic dental services as well as

[1] *Dental Delivery Systems Terminology*, Public Health Service, Health Resources Administration, U.S. Department of Health, Education, and Welfare Publication No. (HRA) 77-6.

specialty services depending upon which post-doctoral programs are offered by the dental school.

Effectiveness of the dental school dental delivery system as an adjunct to classroom and laboratory teaching is assessed by faculty members who monitor and evaluate the treatment provided and who attest to student proficiency by approving treatment and by awarding grades.

The project team did not observe efforts by the three schools visited to achieve efficiency in the delivery of dental services. There were no programs to monitor the level of output of dental services relative to student hours in the clinic, nor to control the amount of resources consumed.

Based on the sites visited, the dental school dental delivery system places a high premium on assuring the quality of the dental care provided. At each of the sites visited, quality control procedures were observed throughout the system.

Chapter V of the final report contains the most detailed portions of the description and documentation of the dental school dental delivery system. Each of the 16 system elements, defined in the previously referenced U.S. Department of Health, Education, and Welfare Publication Number (HRA) 77-6, is discussed as it relates to the composite system description resulting from the site visits and other data gathering activities during the project. Minor differences among the three dental delivery systems are identified, however, the observed systems were basically quite similar. Following the detailed discussion of each system element, the remainder of Chapter V contains narrative explanations to accompany the composite system flowchart in Appendix A.

The dental delivery system associated with dental schools across the Nation provides dental care to selected individuals as an integral part of the process of educating future dentists. In this role, the system has several attributes which are, for the most part, unique with respect to other dental delivery systems and which have significant impact on the characteristics of the system. Briefly stated, these attributes are:

(1) the dental care provided by the system is a secondary objective of the dental educational process,
(2) the dental care providers (students) are, except in post-graduate specialty areas, not professionals,
(3) the primary responsibilities of the professionals (faculty) involved are in the educational process, not in the delivery of care,
(4) there is a continuous turnover of providers as they progress through the educational process,
(5) patients receiving dental care are selected by the system on the basis of the type of treatment they require,
(6) the dental care delivery system is not only non-profit, it is not financially self-sustaining, and
(7) almost all funds for the creation and operation of the system are obtained to support the educational process, not the delivery of care per se.

CONTENTS

I. INTRODUCTION 1

Objective and Scope 1
Methodology 1
Contents of Remainder of the Final Report 3

II. BACKGROUND 4

Number of Students and Schools 4
Number of Patients 4
Number of Dentists 6
Sites Visited 8

III. SYSTEM OVERVIEW 9

Environment 9
Constraints 11
Controls 12
Input 12
Process 13
Output 13
Feedback 13

IV. SYSTEM CHARACTERISTICS 14

Organization 14
Funding 16
Services 17
Effectiveness 17
Efficiency 17
Quality Assurance 18

V. SYSTEM DESCRIPTION 19

A. Elements 19
Access 19
Costs 19
Education 19
Enrollment 20
Environment 20
Evaluation 20
Facilities 21
Financing 21
Manpower Resources 22
Marketing 22
Mode of Delivery 22
Prevention 22
Record Systems 22

CONTENTS — continued

Treatment 23
Types of Services 23
Utilization 23
B. Composite Dental School Dental Delivery System Description 24

VI. SUMMARY 28

APPENDICES
Appendix A - Composite Dental School Dental Delivery System Patient Flow 31
Appendix B - Samples of Patient Record Forms 52
Appendix C - Supporting Data 71

BIBLIOGRAPHY 73

FIGURES
II-1 Schematic Model of a Dental School 5
II-2 Ratios of Dental Schools and Dentists to U.S. Population (1950-1975) 7
III-1 Dental Delivery System Overview 10
IV-1 Typical Dental School Organization 15

TABLE
II-1 Dentists and Dental School Data 6

CHAPTER I. INTRODUCTION

OBJECTIVE AND SCOPE

The purpose of this publication is to describe and document[1] the Dental School Dental Delivery System, one of nineteen such systems identified in U.S. Department of Health, Education, and Welfare Publication No. (HRA) 77-6, *Dental Delivery Systems Terminology*. The term "Dental School Dental Delivery System" is used to denote the universe of all dental schools. However, it is not meant to imply that all dental schools deliver dental services in the same manner. The system that will be described is internally pluralistic, varying between and within dental schools on several basic dimensions or characteristics, including organization, funding, services, effectiveness, efficiency and quality assurance.

The study was carried out by a team of systems analysts and dental consultants, who visited three dental schools to observe clinic operations and obtain detailed information from professional and administrative staff members and dental students.

Although the schools were selected to be reasonably representative, they do not constitute a statistically significant sample and no attempt was made to extrapolate from them to the entire 59 dental schools' dental delivery systems.[2] Thus, what is presented here is a composite description of the way in which patients received dental services at the schools selected during the time period that these schools were visited.

The study reported here was concerned only with an objective description of the dental school dental delivery system. Neither the study nor this report provides evaluations, opinions, assumptions, conclusions or judgments regarding *performance* of the delivery systems in the dental schools.

For purposes of this report, the dental delivery system associated with a dental school is defined to consist of the dental services delivered by students under the supervision of licensed dentists in all of the clinical facilities of the school. Hence, for example, the delivery of dental services by students under preceptorship programs, or by faculty members in intramural or extramural practices are not considered to be part of this system.

METHODOLOGY

The systems approach to analyzing and describing complex people-based organizations has been applied to the dental school dental delivery system in this project. According to one author, this approach consists of " . . . examining the overall interactions of a group of items rather than focusing attention on the operations of each of the component elements in turn."[3] In applying this approach we have developed a description of the process by ". . . stripping the non-essential details from a collection of interacting elements so that the structure of the interrelationships is laid bare for study."[4] The description presented in this report includes a discussion of the system's characteristics and elements, a detailed flowchart of patient selection and care, and a narrative description of the dental delivery system depicted in the flowchart. Although the flowchart does not show all of the minor activities and informal feedback that may exist in the system these important *ad hoc* activities are described in the textual description. The main concern throughout the report is for completeness in describing the major attributes of the dental school dental delivery system that influence its operation.

Within the general systems analysis framework indicated above, this study was carried out in five major steps:

- Literature search,
- Protocol development,
- Site visits,
- Composite system synthesis, and
- Final report.

A brief discussion of each of these steps is presented below.

LITERATURE SEARCH

The search for existing literature on the delivery of dental services by dental schools covered a number of

[1] The phrase "describe and document" will be shortened to "describe" throughout the remainder of this publication.

[2] *Directory and Allied Services, 1975-76*, Manpower Analysis Branch, Division of Dentistry, Bureau of Health Manpower, Health Resources Administration, U.S. Department of Health, Education, and Welfare (includes schools in Washington, D.C. and Puerto Rico)

[3] Optner, S., *Systems Analysis Techniques*, Prentice-Hall, 1965, p. 2.

[4] Ibid.

sources that might reasonably be expected to hold relevant documents, including:

- National Library of Medicine,
- American Dental Association,
- Health Resources Administration Library,
- Dental School Libraries, and
- Division of Dentistry, Bureau of Health Manpower, Health Resources Administration.

Although not a large amount of information relating directly to the dental school dental delivery system was obtained, a number of references on subjects of significant background interest were found. Topics covered included demographic profiles of patient populations, special clinical programs developed at various schools, measures of the quality of treatment received at school clinics and attitudinal surveys of both students and patients.

The results of the literature search are presented in the Bibliography.

PROTOCOL DEVELOPMENT

A protocol describing the approach to be followed, the selection of schools to be studied, the data to be obtained, the analyses to be conducted and the expected form of the results was developed early in the project. The protocol was based on a preliminary view of the delivery system obtained during the first phase of the literature search, refined through extensive discussions with dental consultants.

Criteria to guide the selection of dental schools to be visited were established during the protocol development. Discussions with dental consultants and local dental school faculty members strongly indicated that specific characteristics of the dental school, such as length of program, organization, size or location, are not likely to affect the substance of the services delivered, although they may affect administrative details. Uniformity of standards governing dental education minimizes variations in the nature and quality of services performed and in statistics, such as the number of patient visits per student per year.

In view of the points discussed above, the project team decided that factors other than school characteristics were more significant and established the following criteria for the selection of dental schools to be visited:

- Willingness of the school to cooperate, since the visits would require effort on the part of school administrators, and
- Variation in the size of cities in which the schools are located, since size would introduce some differences in patient populations and demands for dental care.

SITE VISITS

Preparation for visits to the selected dental schools involved a compromise between two conflicting objectives. On the one hand, it was considered desirable to structure the visit in advance, using checklists and interview forms, so that the data needed to describe the dental delivery system could be obtained with maximum efficiency. On the other hand, there was a danger that a highly structured interview might bias the results by imposing its format on the resulting system description. Accordingly, a middle course of using checklists was followed to ensure that all data items were covered without limiting the format or content of the interviews.

In order to minimize the amount of effort required of personnel at the schools, each visit was preceded by a letter setting forth the kinds of information needed, the departments to be visited and an approximate schedule. Much information was compiled in advance by the schools, thus increasing the efficiency of the interviews.

Patient and student statistics, fees, operating costs, staff levels and records management were usually readily available so that the interviews focused on obtaining detailed descriptions of the formal and informal paths by which patients and their records flow through the system. These important flows were discussed with personnel at several levels in the school in order to provide a clear understanding of the way in which the delivery system functioned.

Following each visit to a dental school, a report describing that dental school's dental delivery system was prepared. In addition to the narrative description, these reports included a detailed flowchart representing the dental delivery system from the patient's point of view. Each report was reviewed by the dental school whose dental delivery system was described in order to insure completeness and accuracy. All of the schools responded that the system descriptions and flowcharts were accurate, and the minor modifications they suggested were incorporated into the site visit reports.

COMPOSITE SYSTEM SYNTHESIS

The three individual delivery system descriptions were carefully studied in order to derive a composite description from them. The principal representation of this composite system is contained in the detailed flowcharts in Appendix A. A verbal description, keyed to this flowchart, is presented in Chapter V.

FINAL REPORT

Based on the information in the site visit reports and pertinent documents obtained during the literature search, a comprehensive final report was written. The format and outline of the report were specified by staff of the Delivery Systems Branch, Division of Dentistry. This outline provides for description of the dental school dental delivery system at several levels of detail corresponding to Chapters III, IV and V of the final report. Since each description must be complete, a certain amount of redundancy between chapters is inevitable.

The final report explicitly references observations

made during the three site visits without identifying the individuals or schools involved. Numerical information such as fee structures was aggregated to protect the confidentiality of each school. The composite system is described in detail and observed departures from this composite system are identified.

CONTENTS OF REMAINDER OF THE FINAL REPORT

Chapter II. Background

This chapter deals with the history of the dental school dental delivery system up to the beginning of this study. There is also a discussion of the sites studied to enable the reader to maintain perspective on the composite description of the system.

Chapter III. System Overview

This chapter provides both an overall look at the composite dental school dental delivery system, in broad terms, and a description of the relationships among the components that make up the system.

Chapter IV. System Characteristics

This chapter contains a discussion of the major characteristics of the composite system: organization, funding, services, effectiveness, efficiency and quality assurance.

Chapter V. System Description

Each element[1] of the delivery system is discussed in this chapter. A detailed discussion of the flowchart that describes the composite system, as viewed from the perspective of the patient, is also presented.

Chapter VI. Summary

This chapter contains a brief discussion of the salient points presented in the report.

Appendices

The appendices contain the flowchart describing the patient flow through the system, examples of some typical patient record forms from the sites visited, and a tabulation of clinic fees.

Bibliography

The Bibliography presents the references reviewed during the literature search.

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[1]As defined in *Dental Delivery Systems Terminology*, Public Health Service, Health Resources Administration, U.S. Department of Health, Education, and Welfare Publication Number (HRA) 77-6.

CHAPTER II. BACKGROUND

The dental school dental delivery system is a dual-purpose system, as is indicated in the diagram presented in Figure II-1. The primary objective of the delivery system at the dental school is to provide education for the students; delivery of services to patients is a secondary objective, although clearly an essential component of the educational process. This duality was observed to affect the selection and scheduling of patients and the amount of time required for treatment at all three sites visited.

Educational considerations dictate that the clinic must have patients to provide opportunities for the students to obtain experience in the delivery of dental services. Since students must attain proficiency in a number of procedures, both sufficient numbers of patients and a suitable variety of dental conditions are required in order for students to achieve that proficiency.

A number of items that are necessary for proper education of the student tend to slow down the process of providing service to the patient by requiring multiple visits or long visits or both. These items include:

- Development by the student of a formalized treatment plan for each patient and the evaluation of the plan by the faculty members responsible for operations in the clinic, and
- Close supervision and evaluation of procedures performed by the student, which may lead to repetition or continuation of a procedure until it is completed to the satisfaction of the instructor.

The remainder of this chapter is devoted to a discussion of three major factors that influence the level of services delivered by the dental school dental delivery system; numbers of schools, students and patients.

NUMBER OF STUDENTS AND SCHOOLS

The number of dental students in the U.S. has grown by 81% over the last 28 years, from 11,460 in 1949-50 to 20,707 in 1975-76.[1] As discussed below, this exceeds the expansion in the number of schools over the same time period.

The number of students attending a dental school is clearly subject to limits imposed by the school. These limits are necessary because of availability of funds, physical space and clinical and laboratory facilities. In each of the schools visited it was noted that applications for admission exceed the established limit.

Although it was beyond the scope of this project to determine the factors that affect the demand for dental education, it was clear that, at least at the sites visited, the following are significant:

- Perceived status of dental career,
- Expected income from practice of dentistry, and
- Tuition levels.

The number of dental schools in the U.S. has grown 44% from 41 in 1949-50 to 59 in 1975-76.[2] Some factors that contributed to this growth are:

- Number and distribution of dentists in a State, as related to population,
- Availability of funds to support schools from Federal, State and local sources, and
- Growth orientation of schools.

One of the major factors in the recent growth of the number of schools and number of students has been the Health Professions Education Act of 1963 (HEPA). For example, in the period 1965-1971, HEPA funds of over $300 million[3] were supplied to dental schools for the purposes of new construction, improvements in quality of instruction and student loans and scholarships. Quoting Feldstein,[4] "There has been an increase in the number of dentists, which was greater than what would have occurred without HEPA." (The magnitude of the increase was not estimated by Feldstein.)

NUMBER OF PATIENTS

Although there are a number of factors which would tend to discourage an individual from using a dental school clinic, no major difficulties in obtaining enough patients to carry out clinic operations were experienced by any of the schools visited. The only concern mentioned was that some types of dental problems are not

[1] *Dentistry and Allied Services, 1975-76*, Manpower Analysis Branch, Division of Dentistry, Bureau of Health Manpower, Health Resources Administration, U.S. Department of Health, Education, and Welfare, p. 7.

[2] Ibid.

[3] Feldstein, Paul J., *Financing Dental Care: An Economic Analysis*, Lexington Books, Lexington, Massachusetts, 1973, p. 118.

[4] Ibid.

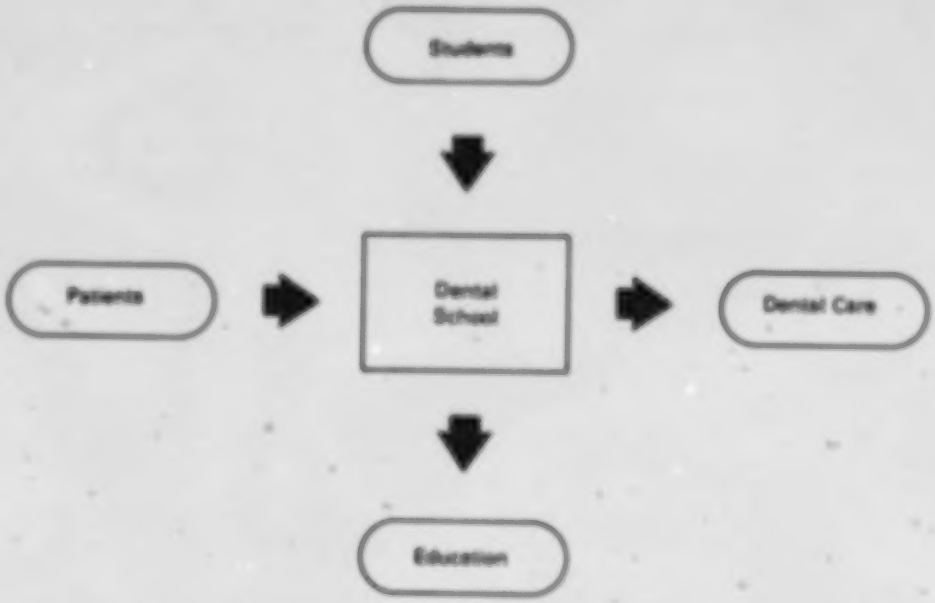


Figure II-1 Schematic Model of a Dental School

presented as frequently as would be desirable from an educational point of view.

Dental school deans at the sites believe that patients are attracted to the school because of the perceived high quality of care, the low cost of services and, in one of the schools visited, because the faculty practice provided specialty services not readily available elsewhere in the State. One dental school dean observed that the presence of a dental school in an area also has the effect of raising the level of awareness of dental health which, in turn, tends to increase the demand for dental services.

Although no detailed study was made, it was clear from the site visits that the following factors influence the number of patients who seek treatment by the clinic:

- Fee levels,
- Allowable techniques for attracting prospective patients,
- Number and distribution of dentists by specialty in local area and Statewide,
- Location of school with respect to transit and availability of parking,
- Availability of prepaid dental plans,
- Attitude of local dentists toward the dental school delivery system,
- Treatment characteristics,
  - quality (actual and perceived),
  - uncertainty of being selected,
  - waiting time between selection and treatment and between treatments,
  - number of visits per procedure,
  - clinic hours,
  - level of privacy in clinic,
  - degree of emergency care provided at clinic,
  - availability of specialists,
  - method of scheduling (total patient care or block),
- Level of dental health awareness near school, and
- Dental health of population near school.

NUMBER OF DENTISTS

As further background for this report, it is interesting to note that during the period 1950-75, the ratio of U.S. population to active civilian dentists has remained at approximately 2,000 with a variation of less than 4%.[1,2] These data are presented in Table II-1. Using these same data, Figure II-2 shows graphically that the numbers of dental schools and graduates have kept pace with population growth during this period. However, the uneven geographical distribution of dentists, whereby rural, inner city and low-income areas have a much higher ratio of people to dentists, is masked by this statistic.[3] Moreover, the types of services demanded by the population have probably not remained fixed in this period. Discussions with dental school deans revealed that they believe there has been a trend toward prevention and a greater use of restorative procedures, rather than extractions.

During this same period there have been significant increases in the number of dental hygienists and assistants and in the use of auxiliaries to perform expanded functions. The number of dentists per dental hygienist has gone from 24 to 4, and the number of dentists per assistant from 1.4 to 0.8.[4,5] This utilization of auxiliaries can increase the productivity of dentists, according to one research study[6] by 110% - 133% with four assistants, and by 62% to 84% with three assistants. One of the schools visited in this study teaches dental students, in a clinical setting, to use dental auxiliaries performing expanded functions. As a consequence, in the opinion of an admin-

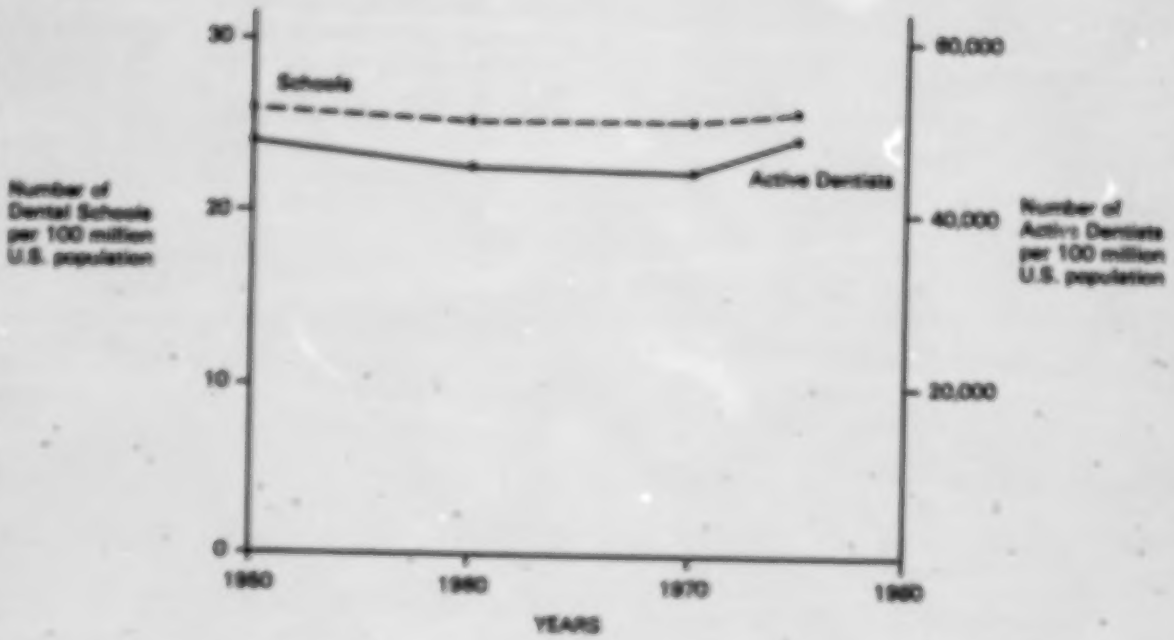
[1] *Statistical Abstract of the United States* (1975).
[2] *Dentistry and Allied Services, 1975-76*, Manpower Analysis Branch, Division of Dentistry, Bureau of Health Manpower, Health Resources Administration, U.S. Department of Health, Education, and Welfare, p. 4.
[3] *Ibid.*, p. 2.
[4] *Statistical Abstract of the United States* (1975).
[5] *Dentistry and Allied Services, 1975-76*, Manpower Analysis Branch, Division of Dentistry, Bureau of Health Manpower, Health Resources Administration, U.S. Department of Health, Education, and Welfare, p. 16, 33.
[6] Lockar, S. L., Johnson, D. W., Thompson, M. B., "Experimental Program in Expanded Functions for Dental Assistants: Phase I Experiment with Dental Teams," *Journal of the American Dental Association*, May, 1971.

Table II-1

DENTISTS AND DENTAL SCHOOL DATA

Year	Population (In thousands)	Number of Dental Schools	Number of Active Civilian Dentists	Ratio: Population to Active Civilian Dentists
1950	151,868	41	75,310	2,017
1960	179,979	47	84,500	2,130
1970	203,810	53	95,680	2,130
1975	213,032	59	106,740	1,996

Sources: *Statistical Abstract of the United States* (1975), and *Dentistry and Allied Services, 1975-76*, Manpower Analysis Branch, Division of Dentistry, Bureau of Health Manpower, Health Resources Administration, U.S. Department of Health, Education, and Welfare, p. 4.



Sources: *Statistical Abstract of the United States* (1975), and *Dentistry and Allied Services, 1975-76*, Manpower Analysis Branch, Division of Dentistry, Bureau of Health Manpower, Health Resources Administration, U.S. Department of Health, Education, and Welfare, p. 4, 7.

Figure II-2 Ratios of Dental Schools and Dentists to U.S. Population (1950-1975)

istrator at the school, there is a high use of dental auxiliaries in that State by graduates of the school.

SITES VISITED

The staff members at all of the dental schools visited were very cooperative and helpful to the project team.

The dental schools visited are all State-supported four-year institutions located within large university medical centers. Though all the schools are in the Eastern United States, the cities in which they are located vary in size: one has a population of less than 50,000, one has approximately 100,000 people, and the third has a population of several million.

All of the schools operated their clinics on the total patient care concept,[1] and all of them had some postdoctoral students in addition to the undergraduate dental students. The numbers of undergraduate dental students ranged from 250 to 500. All sites had student to faculty ratios of approximately 4:1. Although the schools are geographically dispersed, the clinic fee schedules were found to be quite consistent. (See Appendix C.) The numbers of patient appointments in the dental clinics ranged from approximately 50,000 to 100,000 a year.

There were differences in the ways the schools operated that had negligible impact on the way the clinics delivered services. For example, one of the schools was in a State that does not permit charges for dental care provided by dental students. This was accommodated through establishment of a corporation that also included the medical and dental school faculties. This corporation is the entity that actually bills patients for services performed in the clinic. In another school, the patient treatment plan was reviewed and approved by one of the specialty departments, not by the faculty members responsible for oral diagnosis. Another instance of differences found among the schools involved recordkeeping. In one school the records for each patient were turned over to the student responsible for treatment, and there were no centralized permanent records on patients being treated at the clinic.

Despite these differences, the study team found great consistency among the three schools in terms of the objective of this study, namely the way in which the clinics at dental schools deliver dental services. Even so, it cannot be asserted that the delivery system description and the diagram of patient composite flow presented in this report are equally representative of other schools.

[1] Dental school clinics operating under the total patient care concept attempt to assign each patient to one student who can treat all of the patient's dental needs. In contrast, the block care concept may result in the assignment of a patient to a series of students for treatment of dental needs.

The overall national dental delivery system encompasses a variety of functional systems, each of which provides dental care to specific patient groups. Examples of some of the nineteen identified dental delivery systems are: armed forces dental delivery system, dental school dental delivery system, dental auxiliary school dental delivery system, and private practice dental delivery system.[1]

This report is concerned with the dental school dental delivery system (hereafter referred to as the system), and the remainder of this chapter describes the relationships among the components and other influencing factors of this system.

The five system components, briefly stated, are:[2]

(1) INPUT - elements transformed by the system. Specifically, persons with expressed dental needs who are to be serviced by the system, and the materials and manpower that are to be provided as a necessary part of the service.

(2) PROCESSING - elements within the system involved in transforming input into output.

(3) OUTPUT - elements produced by the system; the term embodies the purposes for which the system functions. Specifically, persons whose explicit dental needs have been resolved.

(4) CONSTRAINTS - elements that determine the boundaries of the system, and are beyond the system's capacity to change.

(5) FEEDBACK - elements involved in monitoring the system by use of output criteria and modifying or adapting the system when those criteria are not met.

The system is significantly influenced by the environment in which it functions and by controls placed on its activities. These other influencing factors can be defined as:

(A) ENVIRONMENT - the geographic and demographic setting in which the system functions.

(B) CONTROL - internal restrictions placed on the system which define operating procedures and establish standards for system performance.

System components and influencing factors, illustrated in Figure III-1, are discussed below in terms of the provision of dental care to patients as an integral part of the training and education of dental school students.

[1] *Dental Delivery Systems Terminology*, Public Health Service, Health Resources Administration, U.S. Department of Health, Education, and Welfare, Publication Number (HRA) 77-A.

[2] Ibid.

A. ENVIRONMENT

The environment in which the system operates has geographic and demographic characteristics which influence the demand for and delivery of dental services. The primary objective of a dental school is the education of students; acceptance of patients is primarily based on providing a learning experience for dental students. Accordingly, the school must be able to attract patients with a wide variety of dental needs.

The population surrounding a dental school supplies the input to the dental delivery system, and is, therefore, a very important external force influencing the system. Geographic location of the dental school relative to major population centers and rural areas determines its accessibility to potential patients. The three schools visited are located in cities with populations of approximately (1) 50,000, (2) 100,000, and (3) several million. Dental schools in the first two of these cities attracted patients from rural areas quite distant from the school. In contrast, the remaining dental school principally drew patients only from nearby areas because the large city in which the school is located also contains other dental delivery systems competing for prospective patients.

In general, however, local population size is a rough measure of the pool of prospective patients who may use the system at one time or another. The incidence of dental conditions that are educationally appropriate, from the point of view of the dental school, would be expected to increase with larger population concentrations.

All schools visited are embedded within major university medical centers whose governing bodies, faculty, and students form a significant part of the system's environment. Educational policy, clinic-operating philosophy, funding and resource allocations, student and faculty standards, among other factors, influence the delivery of dental care in the clinic.

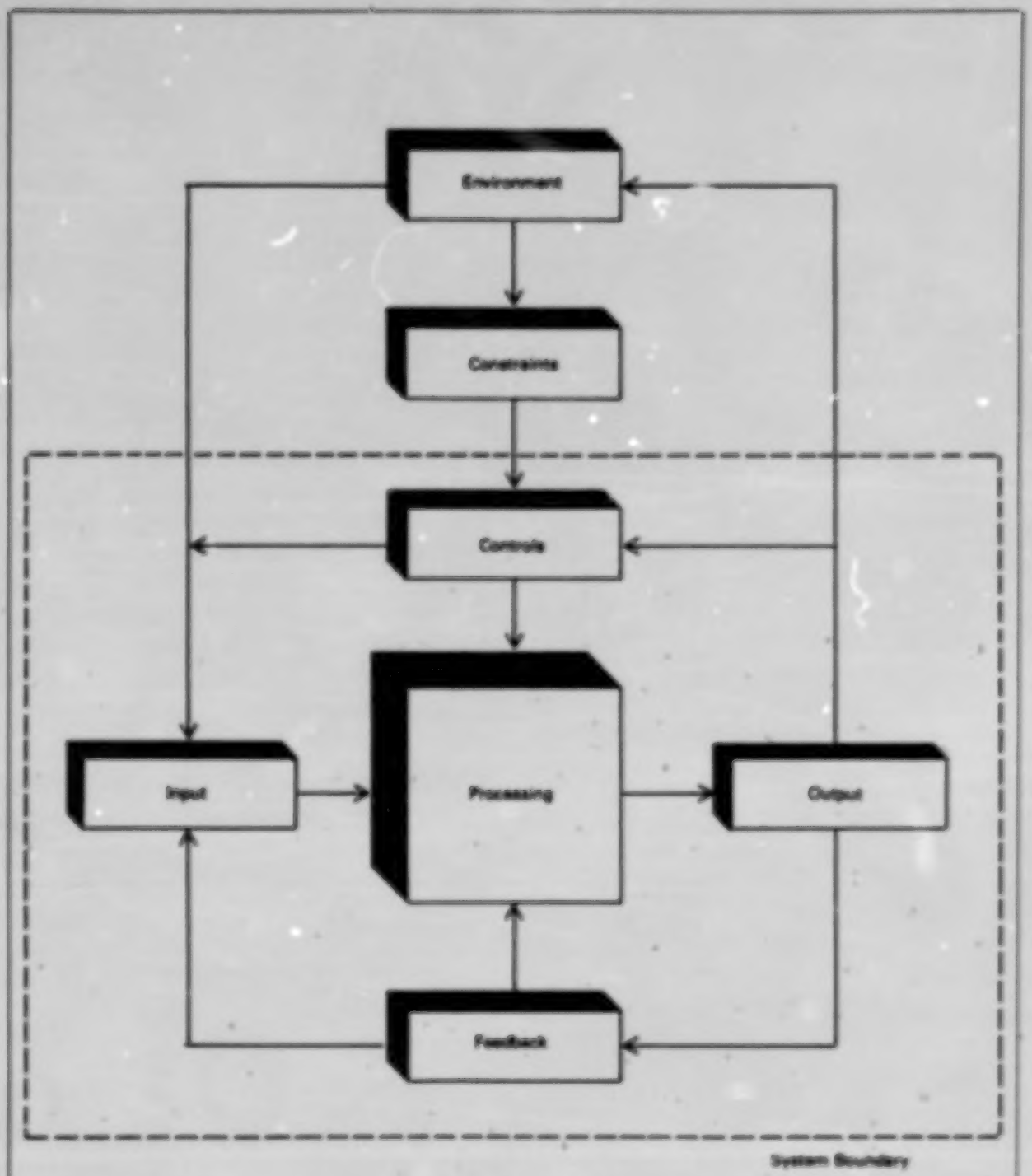


Figure III-1 Dental Delivery System Overview

Local dental professional organizations are also part of the system environment, imposing standards on and deriving support from providers in the system. Dental school faculty members at all sites visited were active participants in these organizations.

To summarize, the influencing factors that comprise the system environment consist of:

- Geographic location relative to population centers,
- Availability of dental specialty care within the service area,
- Dental health awareness and maintenance level in population served,
- Overall university community, and
- Dental professional organizations.

B. CONSTRAINTS

Constraints are factors external to the system which determine its boundaries or limit its functional operations. In terms of a dental school dental delivery system, constraints are imposed by:

(1) Accreditation requirements of the American Dental Association,
(2) State Dental Practice Acts, requirements of the State Board of Dental Examiners, etc.,
(3) Requirements imposed in order to qualify for State or Federal funds,
(4) Operating funds from university budgets,
(5) Facilities and resources,
(6) Demand for dental education,
(7) Code of ethics of the dental profession, and
(8) Supply of patients with dental needs suitable for treatment by students.

Each of these constraints and its impact on the system is discussed below.

(1) The accreditation requirements cover all aspects of the dental school and its clinic operations. The established standards must be met and maintained for the dental school to function. Specific requirements impact student admission policies, faculty appointments, facilities, curriculum, recordkeeping, and quality monitoring, each of which in turn results in constraints on the dental school dental delivery system.

(2) State laws specify what requirements must be met to perform professional dental services within its jurisdiction. These laws may, therefore, influence the way in which patients are treated within the system. As an example, State law may not permit a charge to be made for services provided by a student and, therefore, the school creates a "corporation" which charges for services provided.

(3) A variety of constraints may be placed on the system in order for it to qualify for State or Federal funds. Procurement of these special funds may rely on dental student admission policies, e.g., capitation based on increased enrollment or on establishing research programs or specialty care centers. Thus these funding requirements may constrain the size of the student body, the faculty and the types of specialty care offered by the system.

(4) In providing operating funds, the overall university complex, of which the dental school and its dental delivery system is a part, places constraints on the resources available. The amount of clinic time provided for student-managed patient treatment is directly affected by the operating budget of the dental school. The faculty time involved in clinic supervision, the administrative and clerical functions in the clinic, and the technicians and support personnel are also covered in the operating budget.

(5) The facilities and resources devoted to the system directly constrain the types and amounts of dental service provided. Clinic facilities dictate the number of patients who can be treated. In one case, a school visited maintained a special fund for capital equipment purchases and improvements. In addition to facilities, there are limitations on the numbers and levels of faculty members which directly affect the system. Capital endowments to provide funds for faculty salaries supplemented other funding sources at two schools. However, at all sites the facilities and resources (faculty and administrative personnel) were geared to the size of the student body and the associated demand for clinic experience.

(6) The demand for dental education in all three observed situations was far greater than the number of dental school openings each year. In one case a school had established stringent grade averages which a student must meet to even be considered for acceptance. State limitations on dental school enrollment had been imposed on one State-supported school to prevent an excess of practicing dentists in that State. As a result, limitations on dental school enrollment constrain the extent of dental services provided by the system.

In addition to undergraduate clinics, post-doctoral specialty clinics can be maintained when there is sufficient student demand. The demand for post-graduate dental education has an impact on the dental delivery system because it makes specialty treatment services available within the clinic setting, and increases the types of patients and the complexity of problems which may be treated. All three sites had post-doctoral clinics in some specialty areas.

(7) Whenever two or more dental delivery systems coexist, the code of ethics of the dental profession tends to minimize conflicts. For example, dental treatment services provided by a dental school clinic cannot be actively advertised.[1] Referrals of patients between the dental school and other sources of dental care are handled so as not to compare treatment or impugn the reputations of other professionals.

(8) As discussed under environment, the supply of suitable patients imposes a constraint on the delivery of

[1] That, in most cases, can the services provided by the other delivery systems be advertised.

dental services by a dental school. Without a reservoir of prospective patients, the delivery system could not function. In comparing the number of prospective patients enrolled for clinic care each year with the number actually treated, there appears to be an abundance of suitable patients at all three locations visited. In talking with the clinic administrators, however, it is clear that there is a wide range of patient suitability. In the absence of a patient with a particular dental need, for example, a student may have to practice the clinical procedures in a piecemeal fashion on a succession of patients.

C. CONTROLS

Controls are those limits and restrictions imposed on the dental school dental delivery system from within. As shown in Figure 3, controls are imposed on the inputs and on the processes by which they are transformed to outputs. In general, control represents the rules by which the system operates within the outside constraints imposed on the environment. At all three sites visited, controls were exerted on the delivery system as discussed below; differences among the schools were minimal.

Because the system is school-based, its operating hours are frequently limited to some portion of the weekdays, and usually exclude several holiday and vacation periods during the year. This control on hours of operation restricts the availability of the system to patients but fits with educational commitments of the students.

Within each system there are selection criteria that provide a basis for screening prospective patients in order to select those with dental needs most closely related to student requirements. These procedures for screening and selection of patients, described in detail in Chapter V, are controls to ensure that the student educational needs are matched with the most appropriate available patients. Through this control, dental school dental delivery systems routinely screen and enroll many more patients than can be treated in a given time period in order to increase the chances of finding suitable patients for the students. At one school the ratio of patients enrolled to those treated is nearly 3:1.

Establishment of fee schedules is one of the internal controls which affects the supply of prospective patients as well as the numbers and types of treatment procedures performed by providers in the system. Fees may be set to recover the cost of materials, to provide financial support, and in one observed case, to attract patients with certain dental needs. The basis for the fee structure is discussed in Chapter IV.

Controls on the process of dental delivery include those governing operations and resource allocation, patient assignment, supervision and evaluation of the student, and recordkeeping.

The dental school faculty exerts overall control over the various processes of dental care delivery. First, at a policy level, the faculty establishes operating principles and allocates clinic resources. Second, at the operating level, the clinical facilities for student providers, and the mode of access to treatment supplies, are designed to permit close faculty control. The assignment of a patient to a student, the student's preliminary examinations of the patient, development of a treatment plan and all phases of the treatment itself are closely supervised and monitored by faculty members. Finally, controls on the delivery of dental care are monitored by creating and maintaining patient and student records on which each treatment step is identified, evaluated and approved by an instructor.

D. INPUT

The input component of the system consists of the prospective patients who seek dental treatment from the system and the resources devoted to the treatment of these patients. The procedures by which they are screened, enrolled and treated within the system are described in detail in Chapter V.

Patients are screened and selected for enrollment in the system according to criteria which reflect student needs for clinical experience. Enrolled patients are then matched to student providers on the basis of their dental needs. Not all enrolled patients are assigned to students; those that are assigned may wait several weeks to be contacted by the student provider.

If an enrolled patient is not assigned to a student for treatment within a reasonable period of time, the patient may visit the clinic again for screening and possible enrollment. In fact, in two of the observed systems, enrollment of a patient is only for a limited time. If the patient has not been assigned to a student during the specified time period, the patient must then be screened again to be re-enrolled and reconsidered for student assignment. The time periods of enrollment are usually six months to one year. At one of the schools visited, enrolled patients who were not assigned for treatment during this period were asked by letter if they wished to remain enrolled for the next assignment period. Because of this student assignment process, the enrolled patient does not know when or if treatment will be provided.

In addition to the expectation of some delay in receiving treatment, other controls and constraints may influence the decision of a prospective patient to accept treatment. The site visits revealed that student treatment, and the associated instructor monitoring and evaluation, usually result in long appointments and require the patient to return for more appointments than might be expected. For example, at one site, a prospective patient can expect to make an average of four visits to the clinic before treatment is begun. Clinic operating hours and the necessity to accommodate the student's schedule also impose inflexible demands on the patient's time.

The cost of treatment and the method of payment may also influence the willingness of prospective patients to make themselves available for treatment. At one of the

sites visited, no payment by third-party payors is accepted and deferred payment for lengthy treatment is permitted only on a case-by-case basis.

In addition to patients, there are other major resource requirements. Clearly, a large amount of student and faculty time must be spent in patient screening and enrollment and in delivering and evaluating treatment. Moreover, there are requirements for dental assistants, laboratory technicians, and administrative and clerical personnel. Finally, adequate supplies and material to be used in the treatment procedures must also be available as input to the system.

In summary, the input component of the system represents the raw materials — patients, students, instructors, support personnel and supplies — with which the system satisfies dental needs and provides educational experiences.

E. PROCESSING

The processing component of the dental school dental delivery system represents the actual delivery of dental services to selected patients. This component includes, but is not limited to, the functions listed below:

- Scheduling patients for appointments,
- Scheduling clinic facilities,
- Developing and obtaining approval for a treatment plan,
- Providing referrals and consultations to patients,
- Sequencing treatment procedures,
- Managing and treating patients,
- Providing supportive information such as radiographs and laboratory analyses,
- Monitoring student performance,
- Maintaining patient records,
- Meeting educational goals,
- Maintaining supply inventories, and
- Receiving and disbursing cash for services rendered.

Depending upon the dental need, patients spend varying amounts of time in the treatment process. A very detailed discussion of these and other functions in the process component are included in Chapter V, System Description.

F. OUTPUT

The output component of the dental delivery system consists of the patients whose dental needs have been served by the system (the output of the educational system consists of those students who have met the educational requirements of the system). For both patients and students, documentation of treatments provided attests to the resolution of dental needs. This amounts to removing the patient's file from the file of active enrolled patients and giving the student credit for the clinical skills demonstrated.

Patients return to the community with attitudes toward the treatment received and the procedures followed in managing their treatment plan and evaluating the results. Since word-of-mouth may be the principal method of marketing the system's services, informal patient appraisal influences others who may be seeking care at the clinic. The patient then returns to the local dental community for subsequent care; none of the sites visited provides continuing dental care or regular preventive check-ups.

Student performance is evaluated and recorded as part of the output component, because the resolution of patient needs represents completion of the student's clinical requirement.

G. FEEDBACK

The feedback component represents internal system monitoring to determine how effectively system objectives are being met. Quality assurance methods, discussed in greater detail in Chapter IV, may reveal opportunities for system improvement. The feedback component represents the mechanism by which these changes are implemented. Although system performance data exist in patient and student records, e.g., average number of patients per day, average number of patients per student, etc., none of the sites visited prepared regular aggregations of these data to measure system performance. In the systems observed, the principal measures used in monitoring the system were student accomplishment and revenues produced.

Student performance, as evaluated by instructors, is measured in terms of the numbers and types of successful procedures performed, quality of treatment plans, quality of treatment provided, patient management and record-keeping. At one of the dental schools, each student, at graduation, must present the records of all of his or her clinic patients to a faculty panel. The student explains the disposition of each assigned patient. (This school operates its clinic on the total patient care concept.) The dean observed that the necessity for this accounting improves the quality of patient records maintained by students.

Revenues produced constitute another important measure of system performance. Revenue goals are set for specified time periods, such as a school year, and actual revenues collected are compared on the basis of types of service provided. In some cases, operating experience has suggested adjustments to the fee structure.

Two of the dental schools visited had recently audited a small sample of patient records, and in both cases, significant numbers of ambiguous or omitted data entries, missing folders, and unresolved treatment plans were found. The feedback component was used to enact stricter documentation procedures at both schools as a result of these findings.

The dental delivery system associated with dental schools across the Nation provides dental care to selected individuals as an integral part of the process of educating future dentists. In this role, the system has several attributes which are, for the most part, unique with respect to other dental delivery systems and which have significant impact on the characteristics of the system. Briefly stated, these attributes are:

- Dental care provided by the system is a secondary objective of the dental educational process,
- The dental care providers (students) are, except in post-graduate specialty areas, not professionals,
- The primary responsibilities of the professionals (faculty) involved are in the educational process, not in the delivery of care,
- There is a continuous turnover of providers as they progress through the educational process,
- Patients receiving dental care are selected by the system on the basis of the type of treatment they require,
- The dental care delivery system is not only non-profit, but is not financially self-sustaining, and
- Almost all funds for the creation and operation of the system are obtained to support the educational process, not the delivery of care *per se*.

In light of these inherent features of the system, traditional discussion of system characteristics such as organization, funding, effectiveness, and efficiency is difficult. For example, the organizational composition and the funding of the system are actually dictated by, and result directly from, the dental school with which the delivery system is associated. Analysis of dental school characteristics is clearly beyond the scope or intention of this report. Therefore, characteristics of the dental delivery system are discussed below with reference to the larger dental school framework in which it is embedded.

A. ORGANIZATION

Dental schools are typically organized by subject matter areas under a dean who reports either to an overall medical center or biological sciences dean or directly to the college or university president. The subject matter areas, usually departments headed by chairpersons, represent traditional educational topics in the field of dental studies, as shown in Figure IV-1.

In some dental schools, interdisciplinary departments have been formed, e.g., Family Practice Dentistry and Community Dentistry. All of the departments are usually on the same organizational level, though they may vary in faculty size, the extent of advanced courses or the numbers and types of courses required for the degree programs offered.

The dental clinic within a dental school is a facility which is shared by all students and academic departments as a workshop for the practice, demonstration and application of the procedures and techniques taught within the school. The clinic includes: undergraduate and graduate student operatories, radiographic facilities, laboratories, facilities for construction of prostheses, reception rooms, supply rooms, record repositories and staff offices.

One of the senior dental school faculty members is appointed to a supervisory position, with a title such as Dean for Clinical Services. Though departmental responsibilities for technical aspects of clinic operations may be retained, the Dean has administrative control over the clinic and manages its operation.

Each department establishes minimum requirements in its field, including clinical experience and proficiency, and coordinates its needs with the Dean for Clinical Services. This coordination is to assure that clinical facilities are adequate, that students can be scheduled for reasonable clinic hours, that patient supply is sufficient to meet the educational requirements of the dental students, and that proper levels of equipment and supplies are maintained.

In addition to setting objectives for clinical experience, the departments have two further functions relating to clinic operation. First, they must provide sufficient professional supervision during clinic hours. The number of instructors assigned to each session must be adequate to evaluate the students' performance on an individual basis. Secondly, they must set objective standards by which student performance in the clinic can be evaluated.

Working in conjunction with the departments, the Dean for Clinical Services develops facility layouts and scheduling that best meet the total demand for clinic

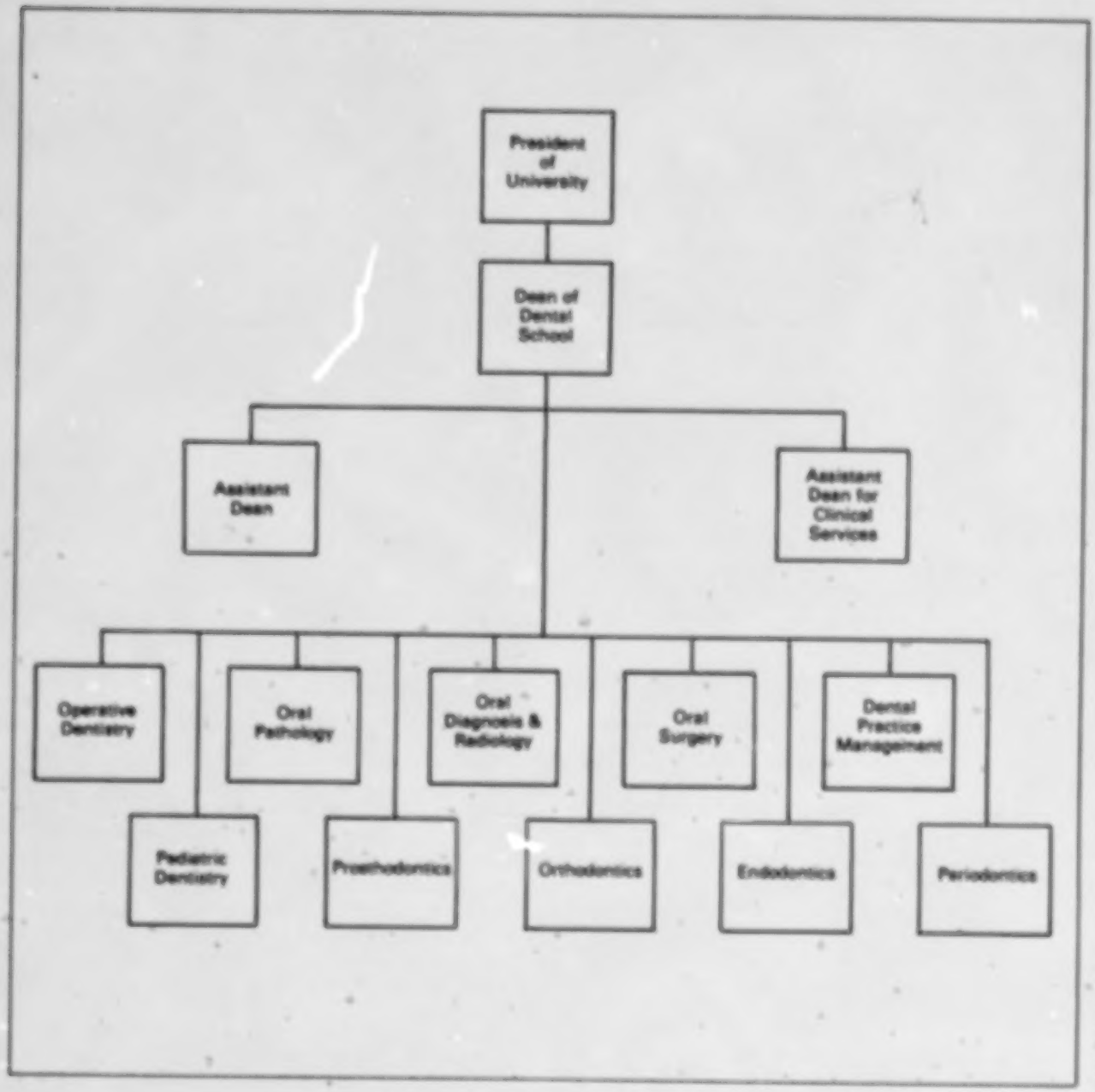


Figure IV-1 Typical Dental School Organization

resources and the requirements for clinic experience to complement student course work.

In addition to the primary function of accommodating pre-doctoral students, the clinic also serves post-doctoral programs, research programs and in some cases faculty practice. Whether or not these other uses are made of the clinic depends upon which departments offer post-graduate programs, the dental school's commitment to research, and the arrangements for faculty use of the clinic facilities.

In order to assure equitable use of the dental delivery system for educational purposes, there is usually an executive committee composed of faculty representatives, possibly elected, from some or all of the dental school departments. This committee advises the Dean on clinical matters and makes recommendations concerning:

- Long-range planning goals for the dental delivery system, e.g., computerization of clinical records, introduction of a family practice clinic,
- Short-term (yearly) allocation of clinic resources to mesh with the educational program,
- Clinic operating philosophy, e.g., block care versus total patient care,
- Administrative management, e.g., use of paid dental assistants or technicians,
- Records management, e.g., computer support, record audits and archives,
- Quality assurance,
- Fee schedule for the system, and
- Fee collection/billing policy.

Even though academic departments are at a common level within the dental school organization, one department may have an implicitly higher status in the dental delivery system. Ways in which this was observed during the site visits included: chairperson of the department is also Dean for Clinical Services; faculty members of the department have primary responsibility for patient screening or for approval of treatment plans; and a high proportion of clinic facilities is allocated to the function of the department. Which academic department achieves this position in a particular system appears to result from internal considerations.

An observed example of such a lead department in the area of patient screening is Oral Diagnosis. However, even when patient screening is the assigned responsibility of Oral Diagnosis, other specialty departments within the school, e.g., Pedodontics and Orthodontics, reserve the right to screen and select their own patients and to approve treatment plans.

As for organization within the system itself, the administrative, technical and clerical staff who perform services directly concerned with the delivery system report to the Dean for Clinical Services. These positions include receptionist, file clerk, information systems analyst, cashier, bookkeeper, office manager, administrative aide, secretary, inventory manager, equipment operating, maintenance and repair technician and dental assistant for four-handed clinical procedures. The numbers of people occupying these and other related positions depend upon (1) the size of the dental school and its associated clinic, and (2) the extent to which these positions overlap with dental school positions. The distinction between the administrative support staff for the dental school and that for the clinic dental delivery system is usually artificial; at all of the sites visited, several clinic positions were occupied by persons who have similar responsibilities in the dental school proper.

B. FUNDING

A dental school dental delivery system may be funded in a number of different ways. The overriding determinant is the nature of the funding base for the university or college of which the dental school is a part. Private institutions have endowments, receive tuition payments, contributions, and fees for services rendered, and seek additional financial support in the form of Federal funds and grants for special programs. State-supported universities, such as the three schools visited, receive State funds as well as private endowments. It was observed that the proportion of the dental school budget composed of monies from each of these sources varies from one school to another and, within the same school, from year to year. Funds for operation of the dental delivery system are allocated within the overall dental school budget, essentially as an overhead budget item — part of the cost of teaching dentistry.

A major difficulty in characterizing funding of the dental delivery system consists of determining which cost items should be charged to the delivery system and which are strictly part of the educational system. For example, a faculty member may have teaching responsibilities in one of the dental school specialty departments, may serve on faculty executive and steering committees within the dental school, and may spend a certain amount of time observing and evaluating students providing treatment to patients in the clinic. Certainly some of this manpower resource is being utilized in the dental delivery system, but the salary and benefits are completely covered by a contract for teaching services entered into with the dental school. Neither the dental delivery system, nor its administrator, has financial control over the faculty members, without whom the system could not exist. A further complication is the fact that the actual providers are students, for the most part pre-doctoral students, who are not paid for the dental services they provide. Hence a major component of the normal cost of providing services is not present.

The dental delivery system is, however, a source of funds for the dental school or the university. Depending upon how the system costs are allocated, the revenues received for the services provided to the patients usually cover the costs of materials, supplies, leased space and equipment, and administrative overhead. Fees for services are set by a dental school faculty steering committee, in

concert with the Dean, and are generally aimed at recovering costs. However, in cases where a fee, set to recover the legitimate costs of providing the service, would be so high as to inhibit the supply of prospective patients, it will be reduced. As a general rule, dental school dental delivery system fees averaged about 50% of the locally prevailing private practice fees at the sites visited. More details are presented in Chapter V in the discussion of financing.

Typically, the revenues collected by the system are added to the university general funds and not separately accounted for, although they may be earmarked for delivery system or dental school use and may be estimated as part of the budgeting process. Thus, the system derives funding from the dental school and the university and returns some fraction of its operating costs to those sources.

C. SERVICES

Services provided by the dental school dental delivery system cover all of the basic dental services and, depending upon which post-doctoral programs are offered, dental specialty services as well. The system selects patients with whom students can obtain clinical experience and develop skills in the usual subject areas:

- Oral Diagnosis,
- Radiology,
- Oral Pathology,
- Oral Surgery,
- Endodontics,
- Pedodontics,
- Prosthodontics,
- Orthodontics, and
- Periodontics.

Complete radiographic and supporting laboratories (e.g., crown and bridge) are also available to the student. The actual delivery of the service by the system, from the patient's point of view, is fully described in Chapter V of this report.

In addition to the technical specifics of the types of dental services delivered, the relationship of the provider to the patient is determined by the patient care concept practiced at a particular school. Under the total patient care concept, the assigned provider will undertake to treat all dental needs of the patient, or to arrange for another provider to assist in completing treatment of the patient. This approach engenders a continuing relationship between student and patient, and makes the provider responsible for comprehensive treatment. Each patient has one provider who is responsible for addressing multiple dental needs and keeping patient records in order.

The concept of block care involves assignment of a provider for each explicit dental need. This does not preclude a provider from treating multiple dental needs in one treatment plan, but it means that enrolled patients are assigned to providers principally on the match of one dental need to a requirement for specific clinic experience. The remaining dental needs of the patient may not be within the capabilities and experience of the initial provider, or may not match that student's requirements. Accordingly, the patient may be assigned to another provider for further treatment.

Neither the dental school faculty members nor the dental consultants on the project team felt that there would be any difference between the two concepts in terms of the care received by the patient. Patient screening, development of a treatment plan and execution of the plan would be the same in both cases — the continuing involvement of a single provider would be the only difference. Based on these discussions, the project team believes that the flowchart in Appendix A, fairly represents both concepts.

The system provides treatment of immediate dental needs, such as relieving pain, for any walk-in patient, together with recommendations for further treatment. However, receipt of such services does not automatically enroll the patient in the system.

Finally, it should be noted that some systems offer highly specialized treatment by teams which may include faculty members as well as post-doctorate student providers. Examples of such specialized services are cleft lip and palate, and cancer rehabilitation. Factors influencing whether or not such special teams exist in a particular system are:

- An existing demand for such services, as for example at a State university medical center serving a large geographic area,
- A qualified team composed of faculty members and post-doctoral students, and
- Research grants or other incentives for study and advancement of state-of-the-art technique in the specialty area.

D. EFFECTIVENESS

For the dental school dental delivery system, effectiveness of the system is defined in terms of how well it offers student providers the opportunity to gain clinic experience and develop skills. The system's effectiveness as an adjunct to classroom and laboratory teaching is assessed by the dental school faculty members who monitor and evaluate the treatment provided and who attest to student provider proficiency by approving treatment and by awarding grades.

E. EFFICIENCY

The project team did not observe efforts by the three schools visited to achieve efficiency in the delivery of dental services. There were no programs to monitor the level of output of dental services relative to student hours in the clinic nor to control the amount of resources consumed.

F. QUALITY ASSURANCE

Based on the sites visited, the dental school dental delivery system places a high premium on assuring the quality of the dental care provided. At each of the sites visited, quality control procedures were observed throughout the system. As discussed below under clinical assessment, record audit and data utilization, the nature and extent of these procedures varied somewhat among the sites.

1. CLINICAL ASSESSMENT

Quality assurance through clinical assessment is a major characteristic of this delivery system. At every stage in patient selection, examination and treatment, evaluation of provider performance is mandatory. Instructors are on duty in each clinical area to perform this monitoring function and to be available for consultation with the student providers. (One observed system maintains a ratio of one instructor for every eight students at work in the clinic.) If an instructor is not satisfied, the procedure is corrected, modified, or repeated, as appropriate, and the instructor reevaluates it. Finally, the instructor notes approval for the development of the treatment plan and for successful completion of each phase of treatment on the permanent record.

2. RECORD AUDIT

Although all of the sites visited explicitly recognized the need for and value of a record audit, none carried it out routinely. One of the sites was about to conduct a record audit, in preparation for an accreditation visit. Another had conducted one as part of an internal study. In discussions during the visits it was learned that these audits had led to the discovery of problems with the records. The record audits that had been conducted were designed to check records for:

- Presence of all relevant forms,
- Completeness and accuracy of data entries,
- Presence of all necessary authorizations from patient (parent or guardian if the patient was a minor), and instructor,
- Signs of recent activity in pursuing the treatment plan, e.g., a recent appointment entry,
- Explanations for lapses in treatment schedule or patient drop-out,
- Current information for patient contact if recall is necessary, and
- Record of fees charged and payments made for all services rendered.

3. DATA UTILIZATION

A number of measures of overall system performance, such as average number of patients treated per time period, average number of visits per patient, revenues generated by treatment type, etc. are available to clinic administrators. Student records are a source of data on clinical services performed by type of treatment and provider proficiency level. Administrative records provide data for use in tabulating patient-hours and services provided, revenues generated and costs incurred per time period. At one site visited, patient recall for interview and examination was considered to be part of the quality assurance mechanism.

Although these data are available, they were not routinely used to develop measures of overall system performance at the sites visited. In fact, formal procedures for gathering overall system data were not typically found. It is interesting to note that two of the sites visited had computerized portions of their record systems and the third was about to conduct a trial of computerization. All three expressed the opinion that within two or three years computerization will have progressed to a point where overall system data will be regularly reported.

CHAPTER V. SYSTEM DESCRIPTION

The purpose of this chapter is to discuss in detail the elements comprising the dental delivery system, as defined in U.S. Department of Health, Education, and Welfare Publication No. (HRA) 77-6, *Dental Delivery Systems Terminology*. To this end, each of these sixteen elements is discussed in terms of the dental school dental delivery system of which it is a part. This is followed by a description of a composite dental school dental delivery system, based on the dental school site visits made by members of the project team. The composite system narrative description is referenced to a flowchart that illustrates patient flow through the system. This flowchart also illustrates the ways in which the system elements have impact on the delivery of services to patients.

In the subsequent discussion, the term clinic is used to denote the entire physical facility wherein dental services are delivered by dental students.

A. ELEMENTS OF THE DENTAL SCHOOL DENTAL DELIVERY SYSTEM

1. ACCESS

This element consists of those factors involved in ensuring that the system's population can readily avail itself of the dental services provided by the system. In this context, access refers both to physical access to clinic facilities and to the procedures established for prospective patients to obtain information about the system and enroll for treatment of their dental needs.

As for physical access, the geographic location of the system relative to population centers and the availability of various forms of transportation significantly influence the ease with which a patient can visit the clinic. Each of the three dental schools visited is located within a university complex and has public transportation available. Private automobile transportation at all three sites was severely limited by lack of parking spaces. Taxicabs did not represent a significant transportation mode at any of the sites.

Frequently, the system serves a population much larger than the community in which it is located. For example, at one school which provided specialty dental care not readily available elsewhere, patients were attracted from considerable distances. For these patients, ease of access was not as important a consideration as the facilities and treatment offered by the system.

The procedures by which a prospective patient learns of the system and enrolls for treatment varied among the three sites. Information on the system was frequently passed from patient to patient by word of mouth and was always provided by the clinic receptionist to those who called the clinic or walked in. As discussed below under enrollment, all three systems have some screening procedures, which may require the patient to make several visits to the clinic before acceptance or rejection for enrollment.

2. COSTS

This element consists of those factors involved in determining and paying for services and materials used by the system. These costs are determined differently, depending upon how the clinic operations are financed.

At the sites visited, facilities and space occupied by the clinic were provided by the university, although the sites differed as to how the cost of such facilities was treated in the school budget. The effort provided by students has no cost, and that provided by dental school faculty members was usually entirely borne by the instructional budget. Costs of personnel who function entirely within the clinic settings (dental assistants, administrative and clerical personnel and technicians) were typically included in the system element costs.

Materials and supplies used in preparing radiographs, in laboratory work and in treatment procedures are inventoried and controlled by each specialty department, and in one observed case, they were costed on a per-use basis. Administrative support materials included regular office supplies, special forms, micrographic records, and computerized data files.

3. EDUCATION

This element consists of those factors involved in providing health education to patients and continuing education to dentists and other staff.

Education of the patient is an integral part of clinic screening and treatment. Through illustration, demonstrations and explanation by the student provider, the

patient is made aware of what constitutes dental health and how to achieve and maintain it.

Continuing education of dentists and other staff within the system is provided by requiring the faculty to practice dentistry. In two of the schools, the faculty practiced in the dental school clinic, and in the third school, they practiced outside of the clinic.

4. ENROLLMENT

This element consists of those factors involved when a person or group applies for and/or registers for the receipt of services from the system. In order to enroll, the patient visits the clinic when patients are being accepted for screening and fills out medical and dental history forms, such as those included in Appendix B. At one site visited, the first 15-20 patients to register at the clinic reception desk by 9:00 a.m. and by 1:00 p.m. weekdays are screened for possible enrollment. At another of the schools visited the clinic set aside certain times for screening sessions, and prospective patients had to make an appointment to be screened. Each screening session is set up to accommodate 55 prospective patients, but in practice, only about 30-35 of the appointments are kept.

Prospective patients are interviewed and examined by a screening team. The results are recorded on forms which then become part of the patient's record. The composition of the screening team varies among the schools visited. At one site, dental school faculty members perform the screening examinations, at another the screening team is a pair of students — one a third-year and one a fourth-year student. The third site visited uses screening teams composed of a student and a faculty member.

Actual enrollment in the system depends upon the extent to which the patient's dental needs, identified by the screening team, match the needs of students for clinical experience. Specified selection criteria are established and modified as student needs change. Limited availability of prospective patients may cause the selection criteria to be relaxed.

Since the object of screening is to identify patients with dental needs most suited to the student providers, some specialty departments perform their own screening in addition to the general preliminary screening. At two of the sites visited, pedodontic and orthodontic patients are subjected to further screening by teams from the individual departments.

The actual process of enrollment is described in detail in the composite system description portion of this chapter which addresses step-by-step patient flow in the system.

Enrollment in the system means only that the patient has suitable dental needs. Within one to six months, the patient will, if possible, be assigned to a student and contacted to make an appointment and begin development of a treatment plan. If a specified time period, such as six months or one year, elapses without such contact the patient must once again visit the clinic when it is accepting patients and have a new screening examination. Although the percentage of enrolled patients actually assigned to students for treatment was not known at all the schools visited, one dean estimated that about one-third of the enrolled patients are actually treated. It could not be determined to what extent this estimate includes patients who, after assignment to a student, dropped out of the clinic treatment program for one reason or another.

The patient records are stored in the system, even if the enrollment did not result in a match with a student. However, the patient's dental condition may have changed and the patient selection criteria may have been altered since the patient's previous enrollment. Therefore, the fact that a patient was accepted for enrollment in the past does not make re-enrollment more probable.

5. ENVIRONMENT

This element consists of those factors that influence the behavior of the system. The various segments of this environment include:

- The university and the dental school,
- The geographic location and demographic characteristics of the population which the system serves,
- The State and Federal legal environment in which requirements for funding and for the practice of dentistry are defined, and
- The professional environment, which includes other dental professionals, dental societies and dental delivery systems.

The impact of each of these segments on the system was discussed in Chapter III, System Overview.

6. EVALUATION

This element consists of those factors involved in determining the integrity, quality, adequacy, and viability of all other elements of the system. At each of the sites visited, various measures of system performance are used to evaluate how well the dental school is meeting its goals of educating students, conducting basic research, providing quality dental care and, perhaps, producing revenues to be applied against the costs of operations. Three types of evaluation were discussed with dental school faculty members: clinical evaluation of students, internal evaluation of school operations including the delivery system, and external evaluations.

A major part of the faculty effort involved in the delivery system is devoted to day-to-day evaluation of the student's management and treatment of patients. Development of the treatment plan and execution of each step in it are reviewed and approved by one or more instructors. As a consequence, the student undergoes continuous evaluation of his clinical proficiency.

Internal evaluation of system operations was carried out on an *ad hoc* basis at the schools visited. The following are typical of the measures of performance used,

although not all were used in every evaluation nor at all of the schools:

- Number of active patients treated per time period,
- Average number of patient appointments per unit of clinic time,
- Fraction of the available system facilities in actual use, over some time period,
- Number of active patients per student,
- Average number of patients treated by a student during the student's degree program,
- Rate of rejection of patients in screening,
- Drop-out rate of patients before treatment plans are complete,
- Average system cost for each type of procedure performed,
- Ratio of system operating costs to revenue generated,
- Ratio of clinic fees, by procedure, to fees charged by private practitioners,
- Success rate of radiographs and laboratory models, and
- Percentage of patient records with omissions or errors.

A discussion of the need for this type of evaluation and the measures that can be used is presented in Chapter III under Quality Assurance.

Finally, the entire dental school, including the dental delivery system, is periodically inspected by American Dental Association accreditation teams. Accordingly, the dental school dental delivery system is subjected to *external* evaluation, in addition to the *internal* evaluations mentioned above.

7. FACILITIES

This element consists of those factors involved in assuring that housing and equipment are available for the provision of dental services. Facilities provided for the delivery of dental services by the dental schools visited included the clinic operatories, specialized treatment equipment, laboratories, radiographic equipment, administrative offices, files and other storage media, reception areas and waiting rooms and stockrooms for supplies and materials. Although there were differences in the arrangement of facilities, the types of equipment and the amount of space per student were reasonably consistent. At the schools visited, there was an operatory for every one or two students.

Faculty members were very much aware of the status of the dental school physical plant and devoted considerable effort to detailed planning and budgeting, under the direction of the Dean of the dental school, to assure that sufficient clinic facilities are provided to meet student needs.

8. FINANCING

This element consists of those factors involved in (1) determining, billing and collecting charges for services and goods provided by the systems, and (2) soliciting and obtaining of other funds to pay for operating the system. At the sites visited, system administrators and faculty members develop a fee schedule for dental services after consideration of local private-practice fees, the clinic operating budget, and the supply and demand of different types of patients. This schedule is periodically reviewed and modified if necessary.

The clinics operated at the three schools visited are not self-supporting, and the fees are not established to recover all the costs of resources and materials. Rather, the fees are primarily set according to two considerations: first, the system fees must be less than equivalent fees charged by private dentists in order to compensate for the considerable inconvenience and additional time required to obtain treatment, and second, fees must not be so low that the local dental community perceives the delivery system as a competitive threat. Another criterion often used in setting fees is the direct operating costs of providing the treatment. There are, however, certain procedures, such as gold restoration, the true costs of which are so great that patients would be deterred from electing them. In such cases, it is necessary to set fees below costs to ensure that students will have opportunities to practice these procedures in the clinic setting.

The range of fees for various procedures charged at the sites visited is shown in Appendix C. Although the fee levels are quite similar, the three schools visited differed significantly in the ways in which fees are collected. At all three, the provider explains the fee collection procedures and discusses the fee schedule before the patient or parent/guardian authorizes the treatment plan.

As far as collection is concerned, one school collects fees in advance at each visit and does not accept third-party payment; one collects at the end of each visit and has about ten percent third-party payment; and one bills each patient monthly and has a significant amount of third-party payment. The latter school uses a collection agency and has a collection rate of 80 to 85 percent. At all three sites, faculty members expressed concern that the increased availability of third-party payment plans will reduce the number of patients in the dental school dental delivery system to an extent that will adversely affect the educational process. None had yet observed this effect, however.

Since the dental school dental delivery system is not expected to be fully self-supporting, other funding sources must be found. It was observed that dental school Deans spend considerable effort in soliciting additional operating funds from the basic funding sources for the university, e.g., alumni and the State legislature, and from the Federal Government in the form of capitation, (financial support based on the number of dental students), or special project grants. The university may also provide some discretionary funds which can be used for short-term financial support of the system.

9. MANPOWER RESOURCES

This element consists of those factors involved in: (1) recruiting, registering and hiring of providers of services and system administrators; (2) ensuring an adequate supply of providers and administrators; and (3) ensuring optimal utilization of providers and administrators. Manpower resources for the dental school dental delivery system are difficult to analyze because they are present principally to fulfill educational responsibilities, rather than to provide dental care. The system providers are dental students who are closely monitored by faculty members. The professional faculty members and administrators are employed by the dental school and, although they play an essential role in the dental delivery system, their numbers, qualifications, salaries, benefits and other incentives are determined by the dental school and university management and are outside the dental delivery system boundaries.

The only manpower resources utilized entirely within the delivery system are dental assistants, technicians, and clerical and administrative aides. These positions are filled without difficulty from the local labor force.

10. MARKETING

This element consists of those factors involved in convincing (1) the system's potential user population to utilize the system's services and (2) potential suppliers of resources (money, goods and/or services) to supply those resources.

Marketing efforts to attract prospective patients to enroll in the dental school dental delivery system were very informal at the sites visited. Two major reasons why the system services are not publicly advertised were pointed out. First, the system should not seek to attract patients away from other dental delivery systems, especially private dentists as local ethics and cooperative professional relationships between dental school faculty and private dentists would be compromised by active solicitation of patients. Secondly, and very importantly, there is reluctance to solicit patients actively because of the high rate of rejection of prospective patients screened by the system. The schools visited reported that they reject up to 70 percent of applicants because the applicants' dental needs are not consistent with educational requirements.

Because none of the sites visited is experiencing any real difficulty in obtaining patients, the sites felt there was no need for an active marketing effort. Referrals from satisfied patients and private practitioners and general community awareness of the presence of the dental school and its delivery system within the university are considered to be sufficient at the present time.

11. MODE OF DELIVERY OF SERVICES

This element consists of those factors involved in determining, establishing, and maintaining arrangements for the administration of services. Since the system is embedded within a dental school, establishment and maintenance of dental delivery services are provided as an integral part of the educational planning process. The delivery system reflects the educational philosophy and the approach to patient management that are taught in the school environment. The dental school Dean, faculty members and clinic administrators design the system to complement the curriculum and further the educational progress of the student by providing opportunities for the student to develop skill and judgment in dealing with patients and treating their needs.

Clinic facilities are allocated on the basis of educational requirements and are arranged to accommodate both patients and students. At the sites visited, it is the responsibility of the student to make appointments with patients; to reserve the clinic facilities (operatories) necessary for each appointment; to request or retrieve patient records prior to the appointment and to return the updated records; to request materials, supplies and assistants necessary for each treatment; and in some cases, to collect fees from the patient.

Administrative support personnel manage the scheduling of clinic facilities, maintain inventories of supplies, maintain patient records, accept fees and issue receipts to patients, issue information about the system by telephone and to walk-in patients. In the main clinic reception area, they assist prospective patients in completing forms and may assist providers in the screening process.

12. PREVENTION

This element consists of those factors that are not part of any other element that are devoted to averting oral diseases and inhibiting the progress of disease already present. Primary efforts to avert oral disease are made by system providers in the course of patient care and are covered under the system elements education and treatment. Activities of system providers directed toward prevention outside of patient care in the clinic would include lectures on dental health to community groups and schools. Although such activities occasionally involved dental school students, there were no formalized prevention programs utilizing student providers at the three schools visited.

13. RECORD SYSTEMS

This element consists of those factors involved in: (1) the accounting process, including projecting the receipt and disbursement of funds; and (2) the creation, processing, maintenance, use and archiving of both health and administrative records. The dental school dental delivery system has extensive documentation requirements because of its multiple educational and service roles. The three basic types of records found at all of the sites visited are accounting records, patient records and student records.

There are accounting records for patient payments, salaries, supply and material costs, equipment rental, space rental, and general office and administrative expenses. Since the dental delivery system is the clinic portion of the dental school, its accounting functions are included in the overall accounting process. If the system permits installment payment for treatment received or periodic billing of patients, then the accounting system has additional records to maintain and bills to prepare. Patients are issued receipts for all payments made for services rendered.

At each site, the most extensive records were those created and maintained for the patients enrolled in the system. The basic patient records were quite similar, consisting of a folder which is assigned a unique identifying number to assist in storage and retrieval and to preserve file integrity. Within this folder there may be some or all of the following: general medical and dental history forms; consultation forms, on which the results of various screening and subsequent examinations are recorded by the provider; a treatment plan (in some stage of development or approval); results of radiographic and laboratory work; authorization forms completed by the patient (or by a parent or guardian if the patient is a minor) that legally permit the provider to perform specified treatment procedures; records of treatment performed with faculty evaluation; and records of appointments and fee payments. Illustrative examples of actual forms used for these purposes are presented in Appendix B.

The patient records described above are retained indefinitely for patients who receive care from the system. Even at schools which specified a retention period for active files, inactive records are physically moved to archival storage but not destroyed.

Retrieval of both active and inactive records is primarily by the identification number. Only limited cross-referencing of physical record systems was observed during the site visits. Systems in which records are partially computerized have greater capabilities for cross-referencing and for gathering patient statistics. None of the sites visited routinely obtains overall system performance measures by analyzing patient records. Performance measures of interest were, to varying degrees, maintained and updated separately from the patient records.

Pertinent data on patients who have been accepted for enrollment were typically maintained in a separate file. This pool of patients who are available for student assignment is usually organized by dental need and used, in conjunction with a file of student needs, to identify optimal patient-student combinations.

The patient's records are reviewed and updated at each examination or treatment session. It is the provider's responsibility to retrieve or request patient records in advance of an appointment and to return the updated folder to the proper record storage area. The instructor who approves the treatment plan and oversees each treatment procedure also reviews patient records, and evaluates not only student treatment but also the record-keeping function performed by the student provider. All monitoring and evaluation points are initialed or signed by the instructor.

A wide variety of student records is, of course, maintained within the dental school. Although the clinical performance of the student in delivering care to patients is recorded, these records are not explicitly part of the dental delivery system.

14. TREATMENT

This element consists of those factors involved in the actual clinical provision of dental services to a particular individual. The system delivers dental care to patients who have been selected on the basis of the relevance of their dental needs to student needs for clinical experience. A typical treatment appointment, derived from observation at the schools visited, might consist of patient record review, examination of patient, selection of necessary supplies, initiation of procedure (either two-handed or four-handed), instructor evaluation and approval of procedure, updating of patient records, counseling of patient, request for additional radiographs or laboratory work if required, scheduling of next appointment, and collection of fees for services rendered.

Although the system is set up to provide dental care in a very orderly and structured way, i.e., screening, treatment plan and treatment consistent with the student's educational progress, persons arriving at the clinic with immediate dental needs are not turned away. These persons are examined by the screening team to determine the nature and extent of dental needs. System providers then relieve pain, and refer the patient to other sources of dental care, as appropriate to their needs.

15. TYPES OF SERVICES PROVIDED

This element consists of those factors involved in determining which dental services will be and are provided to the system's population; this specifically excludes those factors involved in determining the services a particular individual receives. The types of dental services provided by the system are the result of several factors. In addition to general requirements for clinical experience of students which must be met for accreditation, individual dental schools may specify both the types and numbers of procedures to be performed by students in the clinic. The full range of dental specialties is represented in the undergraduate clinics visited, but graduate-level treatment was not offered in all specialties at all of the sites.

16. UTILIZATION

This element consists of those factors involved in measuring the use of the system by the system's population. Since the dental school dental delivery system is

predominantly education-oriented and not service-oriented, utilization, as a measure of productivity, does not have its customary meaning. As long as the number of prospective patients who desire to enroll in the system and the number accepted by the screening process are adequate to meet the total educational needs of the students, the system is fully utilized, even though the same physical facility could handle many more patients per year. Although all of the schools visited maintain patient record systems, there is no attempt by any of the three to measure utilization.

B. COMPOSITE DENTAL SCHOOL DENTAL DELIVERY SYSTEM DESCRIPTION

The flowchart contained in Appendix A depicts the delivery of dental services in a dental school clinic from the patient's point of view. This flowchart represents a composite of the individual flowcharts prepared for each dental school visited. Basically, the same functions and decision points exist at all of the sites so that the composite flowchart could be used to describe clinic operations at any of the sites visited. The few differences that were found are discussed below.

The detailed narrative description presented here is intended to elaborate on the process boxes, identified by numbers in parentheses in the text, and to explain the various decision nodes in the flowchart. The explanatory note at the beginning of Appendix A describes the conventions used in preparing the flowchart.

A prospective patient with a dental need contacts the dental school clinic (1). If the patient telephones the clinic, a receptionist or operator notifies the patient of the clinic hours and may also describe the procedures for seeking dental care (2). During clinic hours, a receptionist in the clinic normally handles inquiry telephone calls. At this time the patient is told of any eligibility requirements that may exist and is told how and when to register for care at the clinic. The patient may ask the receptionist about the types of dental service provided, the method of payment for services rendered, the normal hours for appointments, and the facilities for the handicapped or for small children. The receptionist may also provide advice on parking and public transportation.

If the prospective patient calls when the clinic is closed, e.g., on weekends and during vacation periods, a dental school or university information operator tells the caller when the clinic will be open again (3).

A prospective patient may seek care at the clinic without telephoning first for information. If the clinic is not open when a patient arrives, a sign or notice at the clinic door or reception desk states the hours when the clinic is open so that the patient can determine when to return (1).

The walk-in prospective patient may need immediate dental care, as in an emergency situation, or may simply be seeking to register for dental care on an appointment basis. If the patient does need immediate care, the clinic receptionist, or a dentist in the clinic, determines whether or not the clinic can provide it. For example, if there were no dental professionals available in the clinic, the receptionist would refer the patient to the nearest hospital or other emergency treatment center. The patient may also be sent to an alternate treatment center after examination by a dentist in the clinic (5).

Once it is determined that the patient with an immediate dental need can be treated in the clinic, the patient is asked to complete appropriate medical and personal history forms (4). Examples of these forms are presented in Appendix B. The ways in which immediate care patient records are handled differ among the sites visited. In one case, if the patient has previously been treated at the clinic, the records are retrieved from the central file and are updated to reflect the immediate care provided. At another site, special abbreviated forms are used for immediate care patients.

The immediate care patient waits in the clinic reception area until a provider is available (7). During this wait, the completed forms are placed in a specially marked folder, (bright red, for example), so that the providers can recognize at once that someone with an immediate need is waiting. Usually these patients are treated first, ahead of other walk-in patients waiting to be examined. When a provider is available, the patient with an immediate dental need is treated (8), and an instructor evaluates the treatment (9). If the instructor does not consider the treatment acceptable, the provider modifies or completes the treatment (10), and the instructor evaluates it again. This process continues until the instructor is satisfied with the dental care provided.

Upon satisfactory completion of the treatment given for an immediate dental need, the provider fills out the relevant portion of the patient's records and may recommend further action (11). The forms completed by the provider include those establishing the fee for the services rendered and those recording the patient's dental history and treatment received. Depending upon the nature of the patient's immediate need and general dental condition, the provider or the instructor may make recommendations to the patient for follow-up dental care, e.g., registering as a clinic patient or visiting a private dentist. The patient is also instructed in home care procedures that may be required.

After receiving treatment for the immediate dental need, the patient pays the clinic cashier for the services rendered (12). The cashier issues a receipt for the fees paid and records the transaction. The patient's records are returned to the file (13) and the patient leaves the clinic.

Returning to the decision block which separates patients who need immediate dental care from those who do not, the normal path of a walk-in patient without an immediate need will be described. The next decision block separates those with appointments from new prospective patients.

A patient who has neither an immediate need nor an

appointment but wishes to register for treatment cannot do so unless the clinic is accepting new patients. The clinic providers (dental students and faculty) seek to examine every prospective patient to determine the suitability of the patient's dental needs for the educational program in the clinic. Therefore, the clinic limits the hours during which prospective patients will be accepted. In this way, the clinic staff can ensure that each prospective patient is given a preliminary examination by dental professionals on the initial visit.

If the clinic is no longer accepting patients, e.g., a set number of new patients for the day has already been reached, or the time period for initial registration is over, the clinic receptionist explains the clinic's operating procedures to the walk-in prospective patient and suggests a time to return for registration (6).

If the clinic is accepting new patients, i.e., if the daily quota or time period has not been exceeded, the receptionist asks whether the patient has previously been registered for dental treatment at the clinic. If so, the receptionist retrieves the existing patient records and the patient updates them with current information (14). If the patient has not previously been registered, the receptionist provides a set of blank forms and instructions for completing them (15). This set of forms, partially filled out by the patient, becomes the patient's record and is assigned an identifying number for retrieval purposes. Once the forms are complete, the patient waits in the clinic reception area for preliminary examination by the clinic providers (16).

When a provider is available, the patient is examined to determine the nature of the dental need. At the three sites visited, the preliminary screening examination is performed by faculty members, a faculty-student combination, and a team of third and fourth year students, respectively. Based on the preliminary examination and review of the records, the patient may be referred to a specialty department, such as pedodontics or orthodontics, for further screening (17).

The decision to accept a patient for treatment by students in the dental school clinic depends on several factors. The principal factor is the degree to which the patient's dental needs match the educational requirements of the students performing clinical treatment. Thus the screening team looks for dental conditions that are neither too simple and common nor too involved and complicated to provide educational opportunities in a student-oriented schedule. Examples of these two extremes might be: (1) a simple extraction not associated with orthodontic or prosthodontic plans, and (2) a potentially educational dental need complicated by advanced disease or tissue deterioration, which would delay and interfere with treatment.

If the prospective patient is not selected for enrollment, the provider suggests other treatment sources and explains the reasons for non-acceptance (18). The provider completes the patient records, to show the findings of the examination and the recommendations for further action, and may also complete a billing slip, representing a nominal charge for registration and examination (two of the three sites visited have such charges) (19). The rejected patient returns to the clinic reception area and pays the clinic cashier for services rendered (20). The cashier issues a receipt for the fees paid and records the transaction. The patient's records are returned to the file (21) and the patient leaves the clinic.

If the patient is accepted, the provider discusses the possible delay before initiation of treatment, the number and duration of clinic appointments, the approximate cost and mode of payment and the acceptability of third-party payment plans (22).

The provider completes the patient records. If there are fees associated with the screening examination and initial registration, the provider fills out a billing form. Since the patient is being enrolled, the provider may request that certain radiographs be taken so that the results will be available in the patient records prior to the next appointment (23). The patient's name and identification number are added to a list of all patients who are enrolled for clinic treatment (24). This list is organized by the type of treatment required, as determined during the screening examination. The information in the list is typically only the patients' names and identification numbers.

If the provider has requested that radiographs be made after the screening visit, the patient is sent to the radiographic laboratory, usually located within the main dental clinic. The technician makes the radiographs requested by the provider and fills out a form with information on the areas X-rayed and the date (25). While the patient waits, the films are developed and evaluated by the technician (26). If they are satisfactory, the patient is directed back to the main clinic reception area. If the radiographs are not satisfactory, the technician repeats the process (25, 26).

The patient pays the clinic cashier for services rendered (27). The cashier issues a receipt for the fees and records the transaction. The patient's records are returned to the file (28) and the patient leaves the clinic.

A patient who has had a screening examination and been enrolled for treatment in the clinic waits to be contacted by a student provider from the clinic (29). As the comment box suggests, this waiting period may be days or weeks; in some observed cases, the contact was never made.

A patient coordinator in the clinic attempts to match the dental students' needs for clinical experience with the treatment needs of enrolled patients (30). Once a set length of time has elapsed without contact, the patient is dropped from the patient pool (31). Although the records are maintained in a central storage area, the patient is no longer considered for assignment to a student provider. The patient may attempt to enroll for clinic treatment again at a later time by coming to the clinic for

another screening examination and repeating the various steps from the beginning of the flowchart.

When the patient coordinator finds a match between student and patient treatment needs, and establishes that the patient is still available for treatment, the student is notified (32). The list of student needs and the enrolled patient list are updated to reflect the assignment of the patient to the student. The student contacts the assigned patient by telephone and makes an appointment for a clinic visit (33).

The patient, now fully enrolled, waits for the scheduled appointment with the assigned student provider (34). Patients who may have already had clinic appointments upon entering the system at the beginning of the flowchart, such as a referred patient or a recalled patient, would be directed to this process block.

At the time of the appointment, patient records are retrieved from the file (35), and the student provider examines the patient and the records. The provider determines whether all the information needed is available and initiates or updates the treatment plan (36).

If radiographs are needed at this time, the patient is sent to the radiographic laboratory. The technician makes the radiographs requested by the provider and fills out a form with information on the areas X-rayed and the date (37). While the patient waits, the films are developed and evaluated by the technician (38). If they are satisfactory, the patient is directed back to the main clinic reception area. If the radiographs are not satisfactory, the technician repeats the process, starting at Box 37.

If laboratory work is ordered by the student provider, the patient is taken to the appropriate laboratory, where the needed procedures are performed (39). The results of the laboratory work are evaluated and, if satisfactory, the patient is directed back to the main clinic reception area (40). If the laboratory results are not acceptable, the procedures are repeated, starting at Box 39.

The provider may determine from examination that the patient should seek consultation with a dental specialist. A dental condition may have developed or worsened in the time interval since the last examination. If consultation is necessary, the patient is examined by a dental specialist in the clinic, e.g., a post-graduate student or a dental school faculty member (41). The dental specialist updates the patient's record and makes further recommendations as to whether the patient should seek consultation or treatment outside the clinic (52). The specialist may also advise the student on possible modifications to the treatment plan.

If consultation with a specialist outside of the clinic is necessary, the patient is advised to contact another treatment source (44). The provider updates the medical and dental forms in the patient's records and fills out a billing slip, if appropriate (45). The patient returns to the main clinic reception area and pays the cashier for the services rendered (46). The cashier issues a receipt for the fees paid and records the transaction. The patient's records are returned to the file (47) and the patient leaves the clinic.

If specialized consultation is not necessary, the provider verifies that the patient information is complete for the current appointment, updates relevant portions of the medical and dental forms in the patient's records (43), and checks on the status of the treatment plan.

If a treatment plan has not been prepared, the provider develops one, based on examination of the patient and the records (48). The appropriate instructors review the tentative treatment plan prepared by the student provider (49). If the treatment plan is not satisfactory, the provider modifies the plan and the process is repeated, starting at Box 48. As the comment block suggests, the development of an acceptable treatment plan may require several visits by the patient. The complexity of the treatment procedures, the experience of the student provider and the patient's dental needs all influence the time required to prepare a satisfactory treatment plan.

After the treatment plan has been approved, the student provider discusses it with the patient (50). The treatment plan consists of a list of the specific treatment procedures to be undertaken, a tentative schedule for completion of treatment, and an estimate of the cost to the patient of each procedure within the treatment plan. At this time, the provider also reviews the clinic operating policies with the patient, so that there are no misunderstandings concerning what is to be done, over what time period, and at what cost to the patient.

If the patient does not agree to the treatment plan as it is described, the provider considers whether suitable modifications can be made. If the plan can be modified in accordance with the patient's wishes, the provider will develop a new treatment plan and seek instructor approval, as shown starting at Box 48. If the treatment plan cannot be modified to suit the patient, or if the patient does not agree to the projected schedule or cost of the treatment plan, the provider notes the facts on the patient's record and fills out a billing slip, if appropriate (54).

The patient returns to the main clinic reception area and pays the clinic cashier for the services rendered (55). The cashier issues a receipt for the fees paid and records the transaction. The patient's records are returned to the file (56) and the patient leaves the clinic.

After agreeing to the approved treatment plan, the patient must formally authorize the dental treatment by signature (51). If the patient is a minor, a parent or guardian must authorize the treatment (52). If the parent or guardian is not present, treatment must be postponed until the treatment plan has been properly authorized.

The patient makes an appointment for treatment with the assigned student provider (53). The provider updates the medical and dental forms in the patient's records and fills out a billing slip, if appropriate (57).

The patient returns to the main clinic reception area and pays the cashier for the services rendered (58). The cashier issues a receipt for the fees paid and records the transac-

tion. The patient's records are returned to the file (59) and the patient leaves the clinic. It should be noted that in one of the sites visited, payment for services is collected from the patient before treatment is provided. At the other two sites, deferred payment, third-party payment and installment billing are permitted in some cases.

In subsequent appointments, the patient receives dental treatment from the student provider in accordance with the authorized treatment plan (60). An instructor examines the patient after each procedure has been performed and evaluates the treatment (61). If the treatment is found to be unacceptable, the instructor explains what is required to the provider, who modifies the treatment (62). Then the instructor re-evaluates the treatment (61).

If the treatment performed is acceptable to the instructor, the patient makes another appointment unless the entire treatment plan has been completed. In the flowchart, the patient makes an appointment in Box 53 and follows the subsequent process blocks and decision points until the treatment plan has been completed.

If the patient's treatment plan has been finished, the provider updates and completes relevant portions of the patient's record and fills out a billing slip (63).

The patient returns to the main clinic reception area and pays the cashier for the services rendered (64). The cashier issues a receipt for the fees paid and records the transaction. The patient's records are returned to the file (65) and the patient leaves the clinic.

This is the end of the patient's normal processing in the dental school dental delivery system.

CHAPTER VI. SUMMARY

The report summarized in this chapter describes the dental school dental delivery system, one of nineteen such systems identified in U.S. Department of Health, Education, and Welfare Publication No. (HRA) 77-6, *Dental Delivery Systems Terminology*. The phrase "dental school dental delivery system" denotes the universe of all U.S. dental schools, however there is no implication that all dental schools deliver dental services in the same manner.

In order to develop a factual and representative description of the dental school dental delivery system, a team of systems analysts and dental consultants visited three dental schools. During these site visits in late 1976 and early 1977, clinic operations were observed and detailed information on the delivery of dental services was obtained from faculty and administrative staff. Although the schools visited were selected to be reasonably representative, they do not constitute a statistically significant sample, and no attempt was made to extrapolate from them to the universe of U.S. dental schools. This report presents a composite description of the way in which patients received dental services at the schools selected during the time period in which the site visits were made.

For purposes of this report, the dental delivery system associated with a dental school is defined to consist of the dental services delivered by students under the supervision of licensed dentists in all of the clinical facilities of the school. Hence, for example, the delivery of dental services by students under preceptorship programs, and by faculty members in intramural or extramural practices, are not considered to be a part of this system.

The study methodology consisted of a search of relevant literature, development of a protocol for the site visits, visits to the three selected schools, synthesis of all information gathered to produce the composite system description, and finally, preparation of this final report.

The search for existing literature did not reveal many documents relating directly to the delivery of dental services by dental schools. However, a number of references on subjects of significant background interest were found. These references are listed in the Bibliography.

Early in the project, a protocol was developed which described the approach to be followed in conducting the dental school visits and gathering data for the delivery system description. Discussions with dental consultants to the project and local dental school faculty members strongly indicated that specific characteristics of the dental school, such as length of program, organization, size and location, are not likely to significantly affect the substance of the dental services delivered, although they may affect administrative details. Uniformity of standards governing dental education minimizes variations in the nature of quality of services performed by dental students.

Three dental schools were selected for visits by members of the project team. The Dean and faculty members at each of the schools were very cooperative in describing the dental school dental delivery system and in providing supplementary materials and information to the project team. Following each visit, a report was prepared which described the observed dental delivery system and depicted patient care in the form of a detailed flowchart.

After the contents of these individual site visit reports were corroborated by the schools involved, the information was synthesized by the project team to form a composite dental school dental delivery system description. The resulting composite system, based on the three schools visited, is described in Chapters III, IV and V of this report. A detailed flowchart of the delivery of dental care in a dental school clinic from the patient's point of view, is presented in Appendix A. A narrative explanation, keyed to this flowchart, is included in Chapter V.

The final step in the conduct of this project was the preparation of the final report, of which this summary is a part. The format and outline of the report were specified by the Delivery Systems Branch, Division of Dentistry.

In order to place the dental school dental delivery system described in this report in perspective, Chapter II presents pertinent background information. Over the past 26 years, the numbers of dental schools and dental students have both increased, in large part because of the Health Professions Education Act of 1963.[1] In each of the dental schools visited, it was noted that applications for admission exceed the established limit.

Educational considerations dictate that the dental

[1] Feldstein, Paul J., *Financing Dental Care: An Economic Analysis*, Lexington Books, Lexington, Massachusetts, 1973, p. 118.

school clinic must have patients to provide opportunities for the students to obtain experience in the delivery of dental services. Since students must attain proficiency in a number of procedures, both sufficient numbers of patients and a suitable variety of dental conditions are required in order for students to achieve that proficiency. Although there are a number of factors which would tend to discourage an individual from using a dental school clinic, no major difficulties were experienced by any of the schools visited in obtaining enough patients to carry out clinic operations. The only concern mentioned was that some types of dental problems are not presented as frequently as would be desirable from the educational point of view.

The increase in the number of dental students, and hence practicing dentists, during this time period has kept pace with U.S. population growth. As a result, the ratio of population to active civilian dentists has remained about the same. (See Chapter II for more detail and data sources.)

Chapter III of this report describes the dental school dental delivery system in terms of five system components — input, processing, output, constraints, and feedback[1] — and two factors — environment and control — all of which influence system performance. The relationships among system components are also identified and defined.

Chapter IV of this report describes the dental school dental delivery system in terms of major system characteristics: organization, funding, services, effectiveness, efficiency and quality assurance. Since the dental delivery system is embedded within a dental school framework, discussion of these characteristics refers to the larger context when appropriate.

Dental schools are typically organized by subject matter areas under a Dean who reports either to an overall medical center or biological sciences Dean, or directly to the President of the college or university with which the dental school is associated.

The dental clinic within a dental school is a facility which is shared by all students and academic departments as a workshop for the practice, demonstration and application of the procedures and techniques taught within the school. One of the senior dental school faculty members is appointed to a supervisory position, with a title such as Dean for Clinical Services. Though departmental responsibilities for technical aspects of clinic operations may be retained, the Dean has administrative control over the clinic and manages its operation.

Each department establishes minimum requirements in its field, including clinical experience and proficiency, and coordinates its needs with the Dean for Clinical Services. This coordination is to ensure that clinical facilities are adequate, that students can be scheduled for reasonable clinic hours, that patient supply is sufficient to meet the educational requirements of the dental students, and that proper levels of equipment and supplies are maintained.

A dental school dental delivery system may be funded in a number of different ways. The overriding determinant is the nature of the funding base for the university or college of which the dental school is a part. Private institutions have endowments, receive tuition payments, contributions, and fees for services rendered, and seek additional financial support in the form of Federal funds and grants for special programs. State-supported universities, such as the three schools visited, receive State funds as well as private endowments. It was observed that the proportion of the dental school budget composed of monies from each of these sources varies from one school to another, and within the same school, from year to year. Funds for operation of the dental delivery system are allocated within the overall dental school budget, essentially as an overhead budget item — part of the cost of teaching dentistry.

The dental delivery system is a source of funds for the dental school or university. Depending upon how the system costs are allocated, revenues received for the services provided to patients by students usually cover the costs of materials, supplies, leased space and equipment and administrative overhead.

Services provided by the dental school dental delivery system cover all of the basic dental services as well as specialty services depending upon which post-doctoral programs are offered by the dental school.

Effectiveness of the dental school dental delivery system as an adjunct to classroom and laboratory teaching is assessed by faculty members who monitor and evaluate the treatment provided and who attest to student proficiency by approving treatment and by awarding grades.

The project team did not observe efforts by the three schools visited to achieve efficiency in the delivery of dental services. There were no programs to monitor the level of output of dental services relative to student hours in the clinic, or to control the amount of resources consumed.

Based on the sites visited, the dental school dental delivery system places a high premium on assuring the quality of the dental care provided. At each school, quality control procedures were observed throughout the system.

Chapter V of the final report contains the most detailed portions of the description and documentation of the dental school dental delivery system. Each of the sixteen system elements, defined in the previously referenced U.S. Department of Health, Education, and Welfare Publication No. (HRA) 77-6, is discussed as it relates to the composite system description resulting from the site visits and other data gathering activities during the project. Minor differences among the three dental deliv-

[1] *Dental Delivery Systems Terminology*. Public Health Service, Health Resources Administration, U.S. Department of Health, Education, and Welfare Publication No. (HRA) 77-6.

ery systems are identified, however, the observed systems were basically quite similar. Following the detailed discussion of each system element, the remainder of Chapter V contains narrative explanations to accompany the composite system flowchart in Appendix A.

The dental delivery system associated with dental schools across the Nation provides dental care to selected individuals as an integral part of the process of educating future dentists. In this role, the system has several attributes which are, for the most part, unique with respect to other dental delivery systems and which have significant impact on the characteristics of the system. Briefly stated, these attributes are:

- Dental care provided by the system is a secondary objective of the dental educational process,
- The dental care providers (students) are, except in post-graduate specialty areas, not professionals,
- The primary responsibilities of the professionals (faculty) involved are in the educational process, not in the delivery of care,
- There is a continuous turnover of providers as they progress through the educational process,
- Patients receiving dental care are *selected* by the system on the basis of the type of treatment they require,
- The dental care delivery system is not only non-profit, it is not financially self-sustaining, and
- Almost all funds for the creation and operation of the system are obtained to support the educational process, not the delivery of care *per se*.

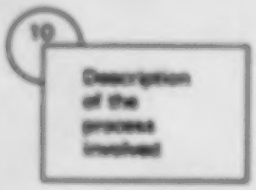
APPENDIX A

COMPOSITE DENTAL SCHOOL DENTAL DELIVERY SYSTEM PATIENT FLOW

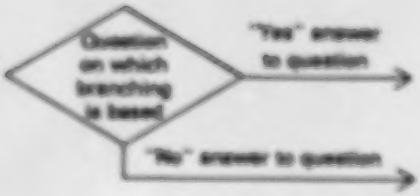
COMPOSITE SYSTEM PATIENT FLOW

EXPLANATORY NOTES FOR THE FLOWCHART

The patient is assumed to move from left to right through the dental delivery system portrayed in the flowchart. The patient progresses through a series of numbered processing blocks,



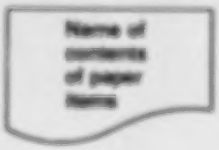
and decision blocks.



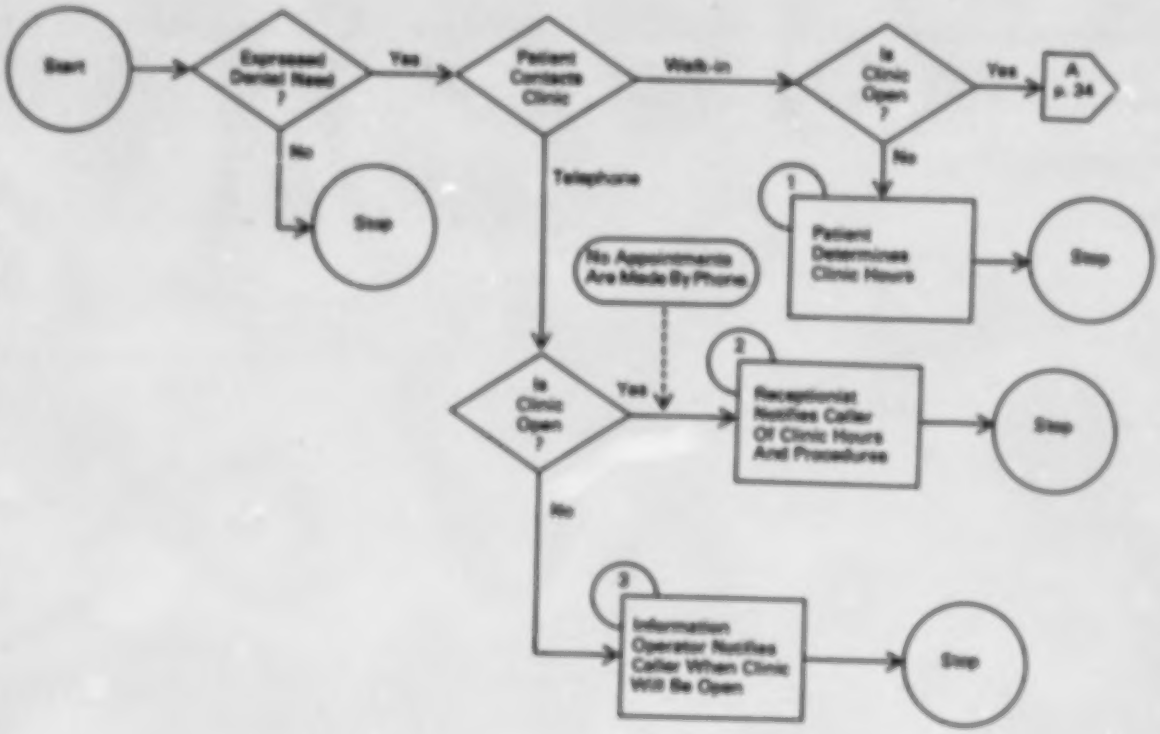
Large arrows containing alphabetic labels connect paths from page to page. The page number is indicated below the letter, as for example:

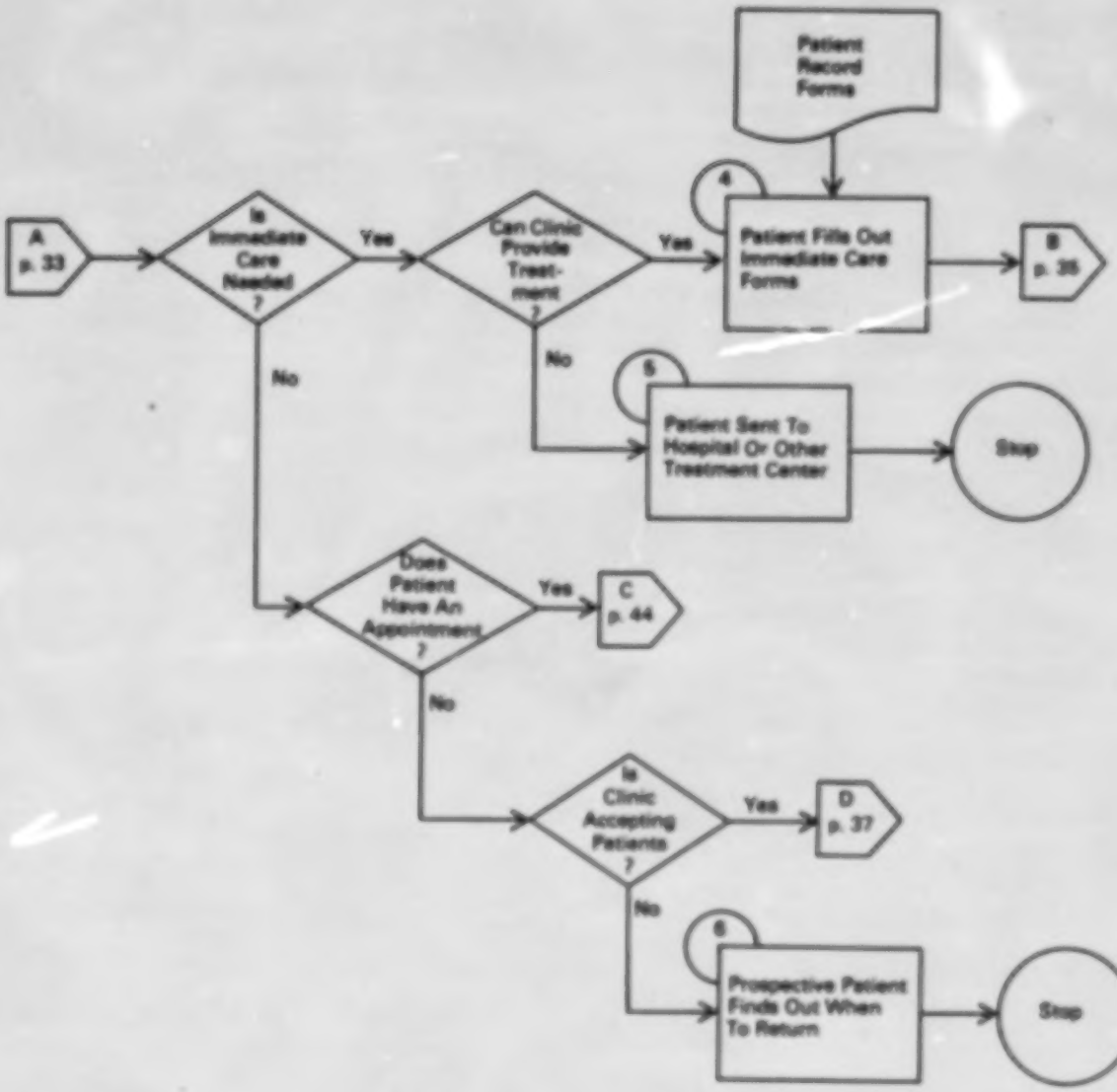
Arrows without page references indicate that the connection is on the same page.

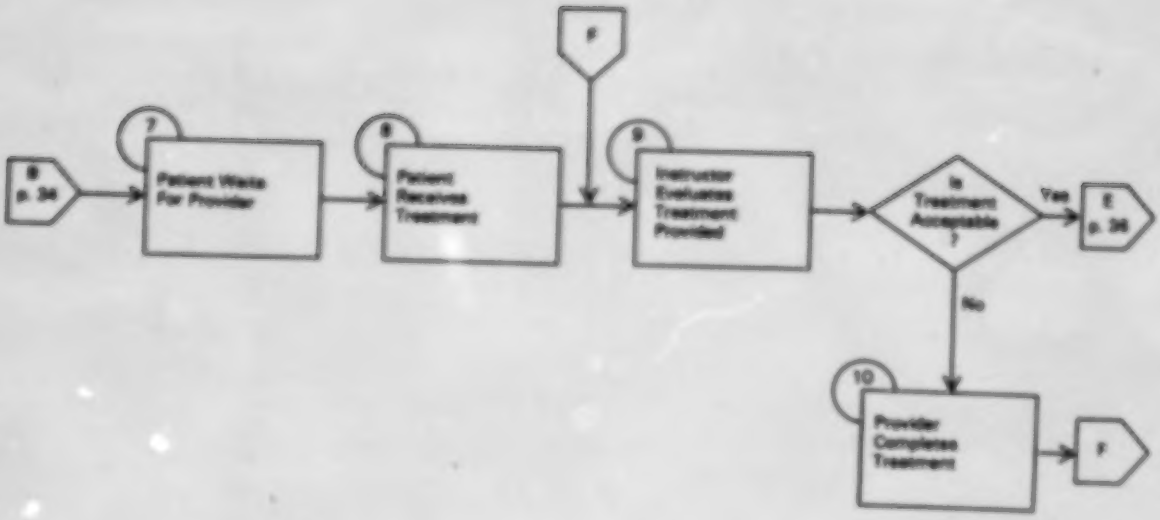
Medical records and other "paper" are shown entering a process block where they are first used, and then continuing with the patient through subsequent blocks until they are shown leaving a process block for storage. These paper items in the system are represented by:

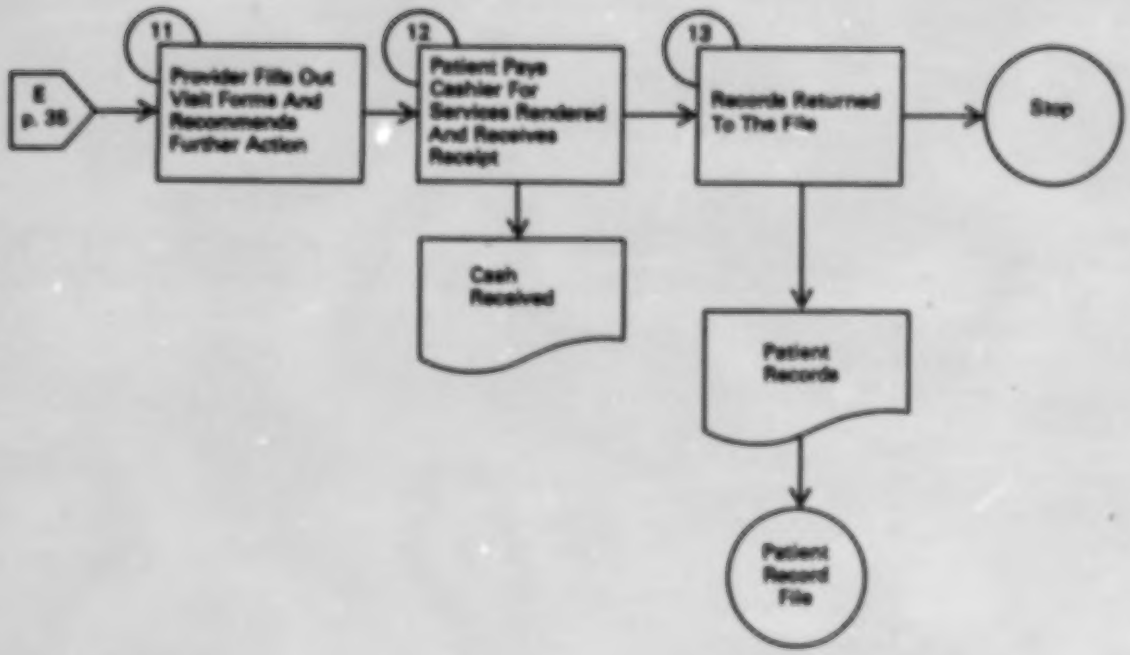


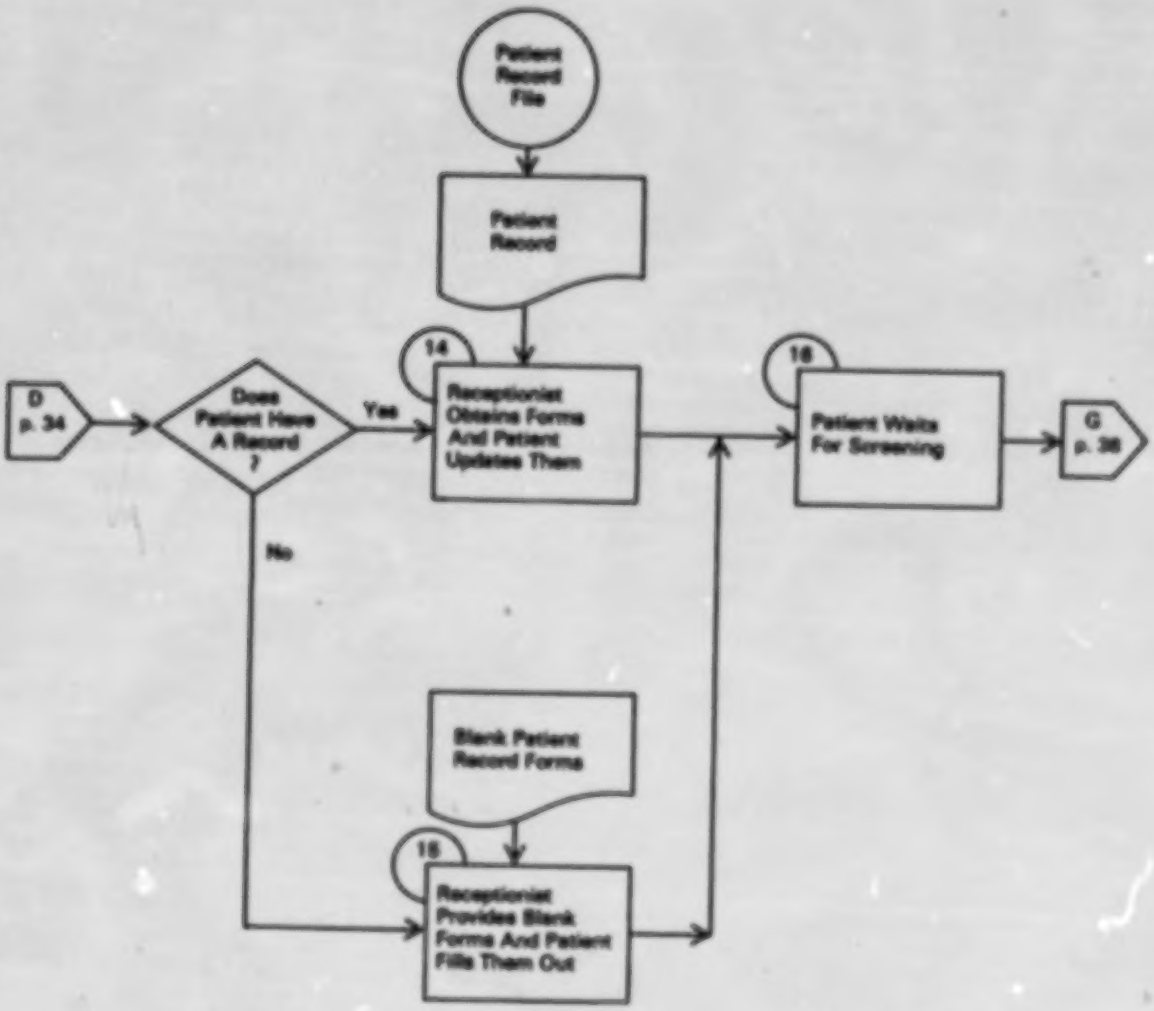
A patient enters the clinic dental care system at "START" and exits at "STOP".

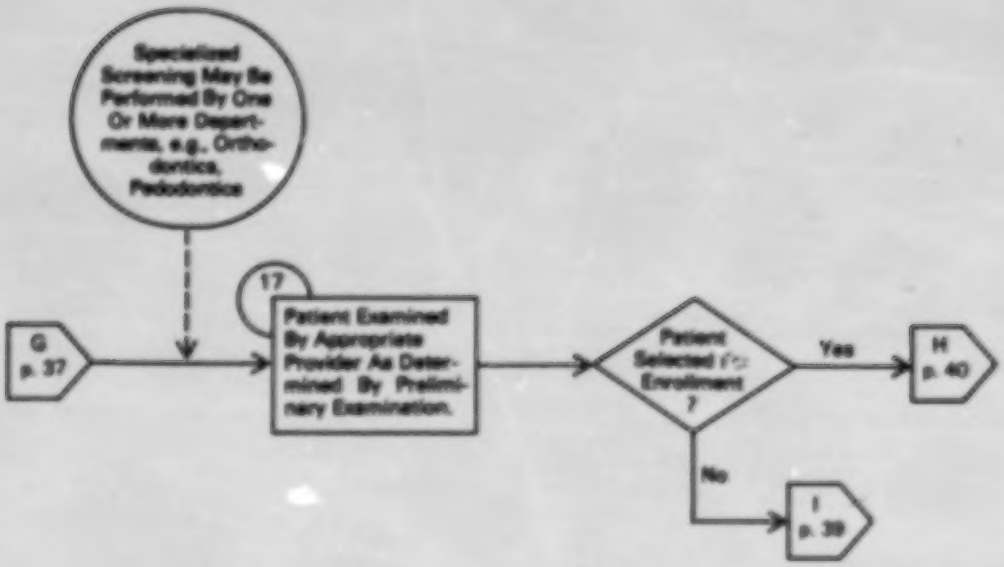

Start
Expressed Dental Need ?
Yes
No
Stop
Patient Contacts Clinic
Walk-in
Telephone
Is Clinic Open ?
Yes
A p. 34
No
1
Patient Determines Clinic Hours
Stop
No Appointments Are Made By Phone
Is Clinic Open ?
Yes
2
Receptionist Notifies Caller Of Clinic Hours And Procedures
Stop
No
3
Information Operator Notifies Caller When Clinic Will Be Open
Stop

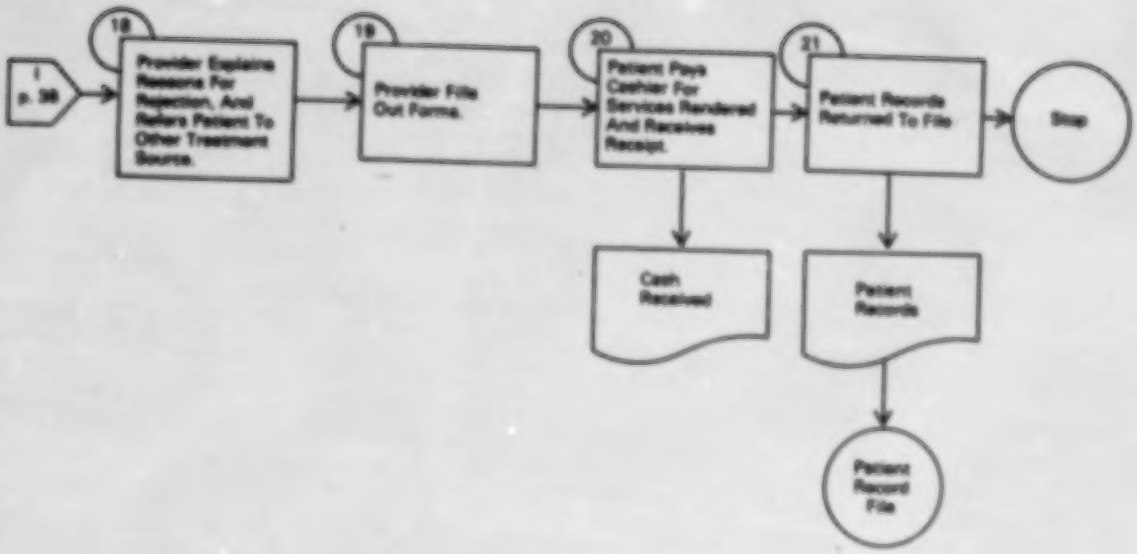

Patient Record Forms
4
A p. 33
Is Immediate Care Needed ?
Yes
Can Clinic Provide Treat-ment ?
Yes
Patient Fills Out Immediate Care Forms
B p. 35
No
5
Patient Sent To Hospital Or Other Treatment Center
Stop
No
Does Patient Have An Appointment ?
Yes
C p. 44
No
Is Clinic Accepting Patients ?
Yes
D p. 37
No
6
Prospective Patient Finds Out When To Return
Stop

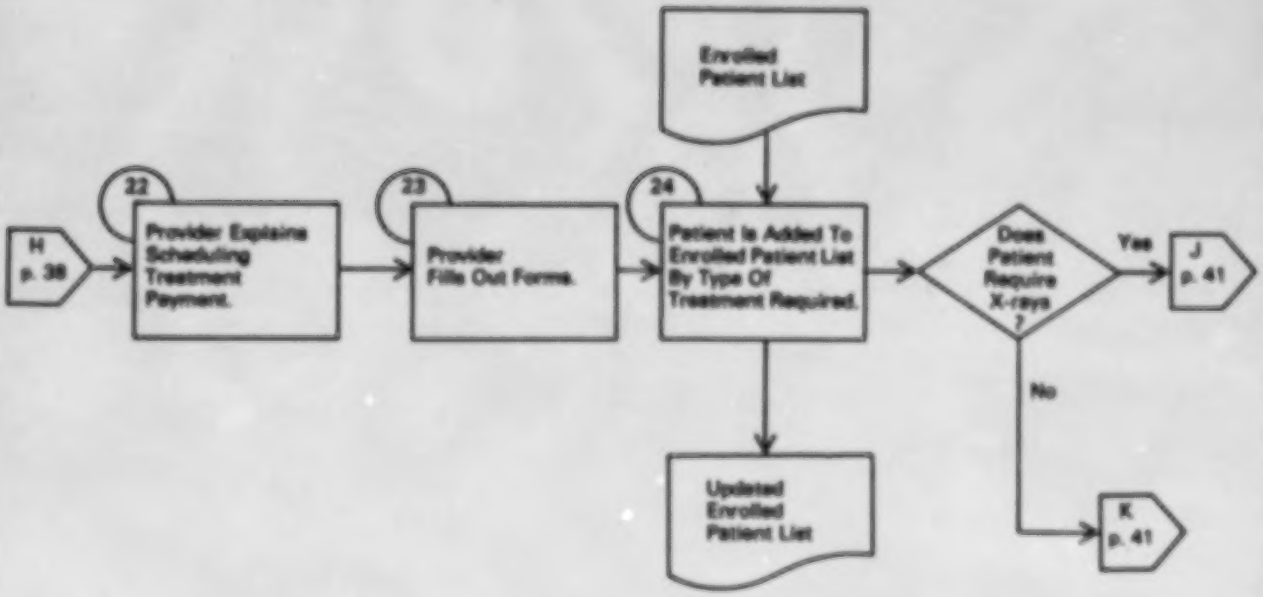

Yes
No

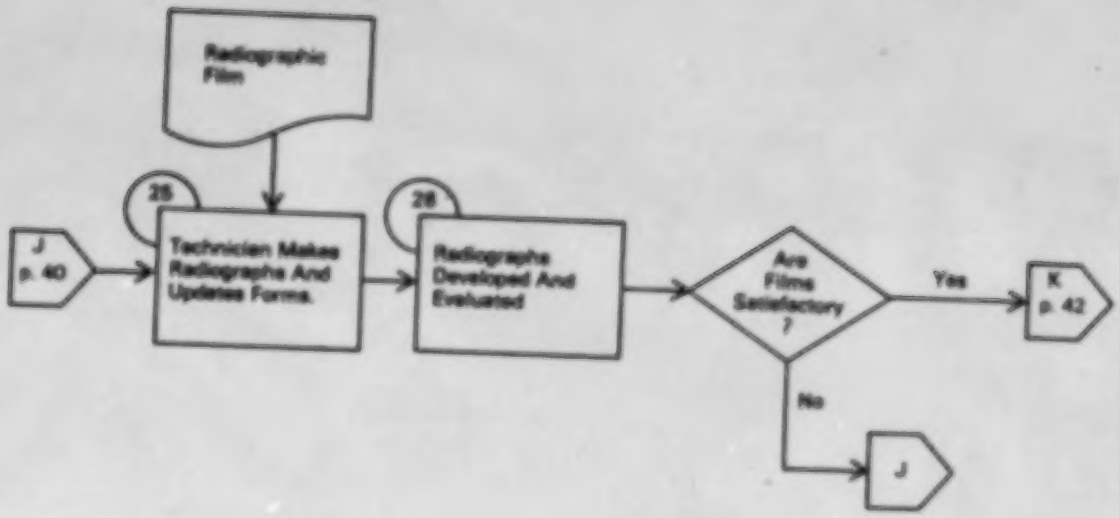

E
p. 35
11
Provider Fills Out Visit Forms And Recommends Further Action
12
Patient Pays Cashier For Services Rendered And Receives Receipt
13
Records Returned To The File
Stop
Cash Received
Patient Records
Patient Record File

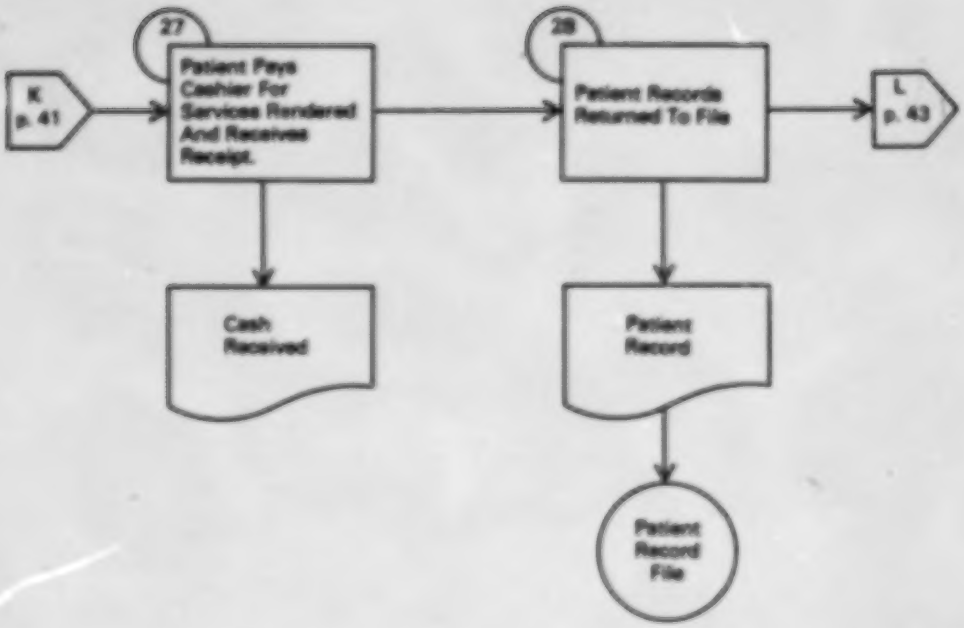

Patient Record File
Patient Record
14
D p. 34
Does Patient Have A Record ?
Yes
Receptionist Obtains Forms And Patient Updates Them
16
Patient Waits For Screening
G p. 36
No
Blank Patient Record Forms
15
Receptionist Provides Blank Forms And Patient Fills Them Out

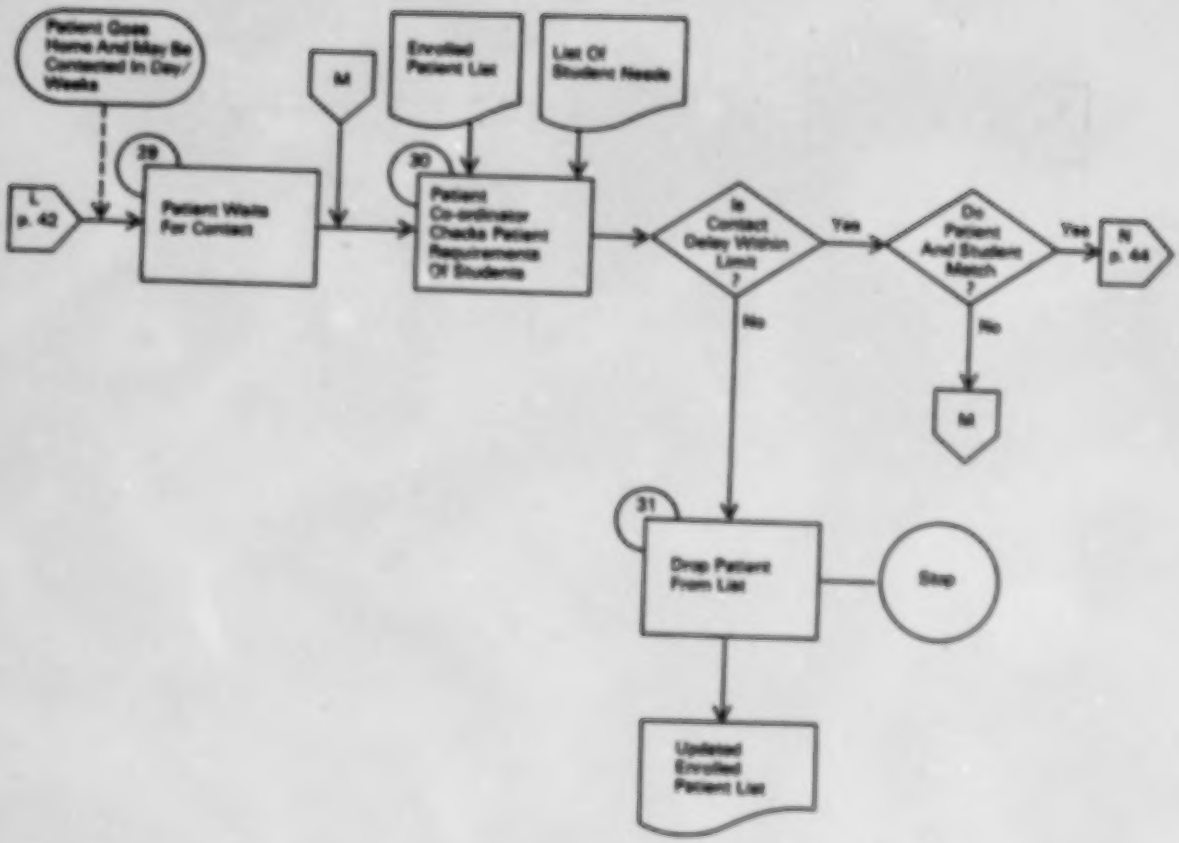

Specialized Screening May Be Performed By One Or More Departments, e.g., Orthodontics, Pedodontics
17
G
p. 37
Patient Examined By Appropriate Provider As Determined By Preliminary Examination.
Patient Selected for Enrollment ?
Yes
H
p. 40
No
I
p. 39

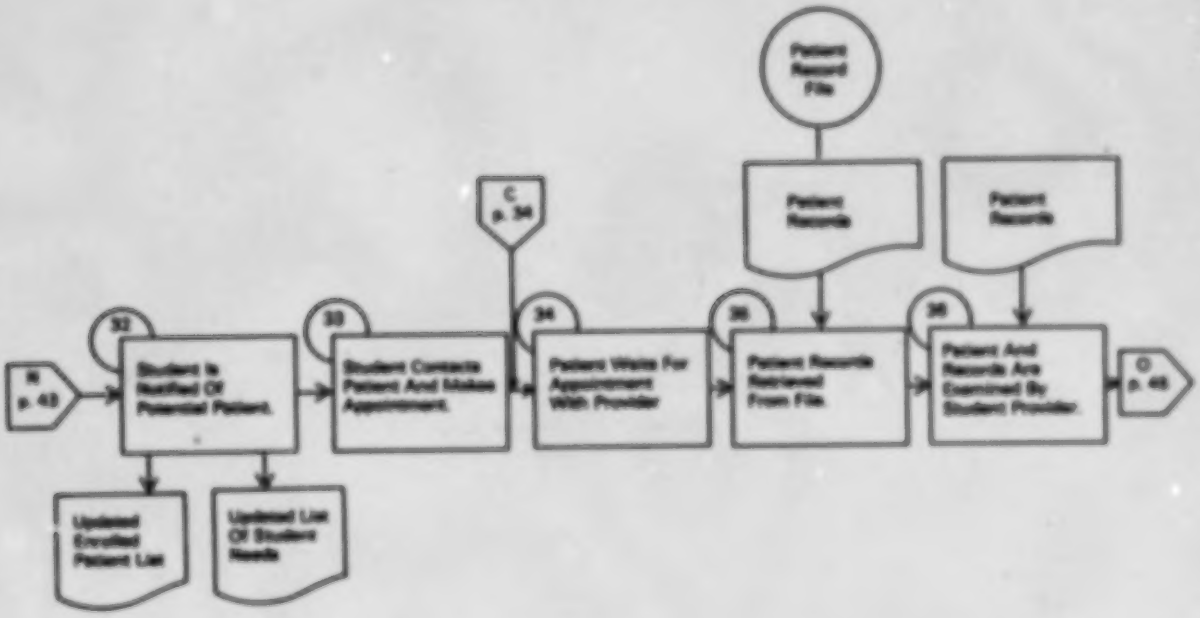

1
p. 38
18
Provider Explains Reasons For Rejection, And Refers Patient To Other Treatment Source.
19
Provider Fills Out Forms.
20
Patient Pays Cashier For Services Rendered And Receives Receipt.
21
Patient Records Returned To File
Stop
Cash Received
Patient Records
Patient Record File

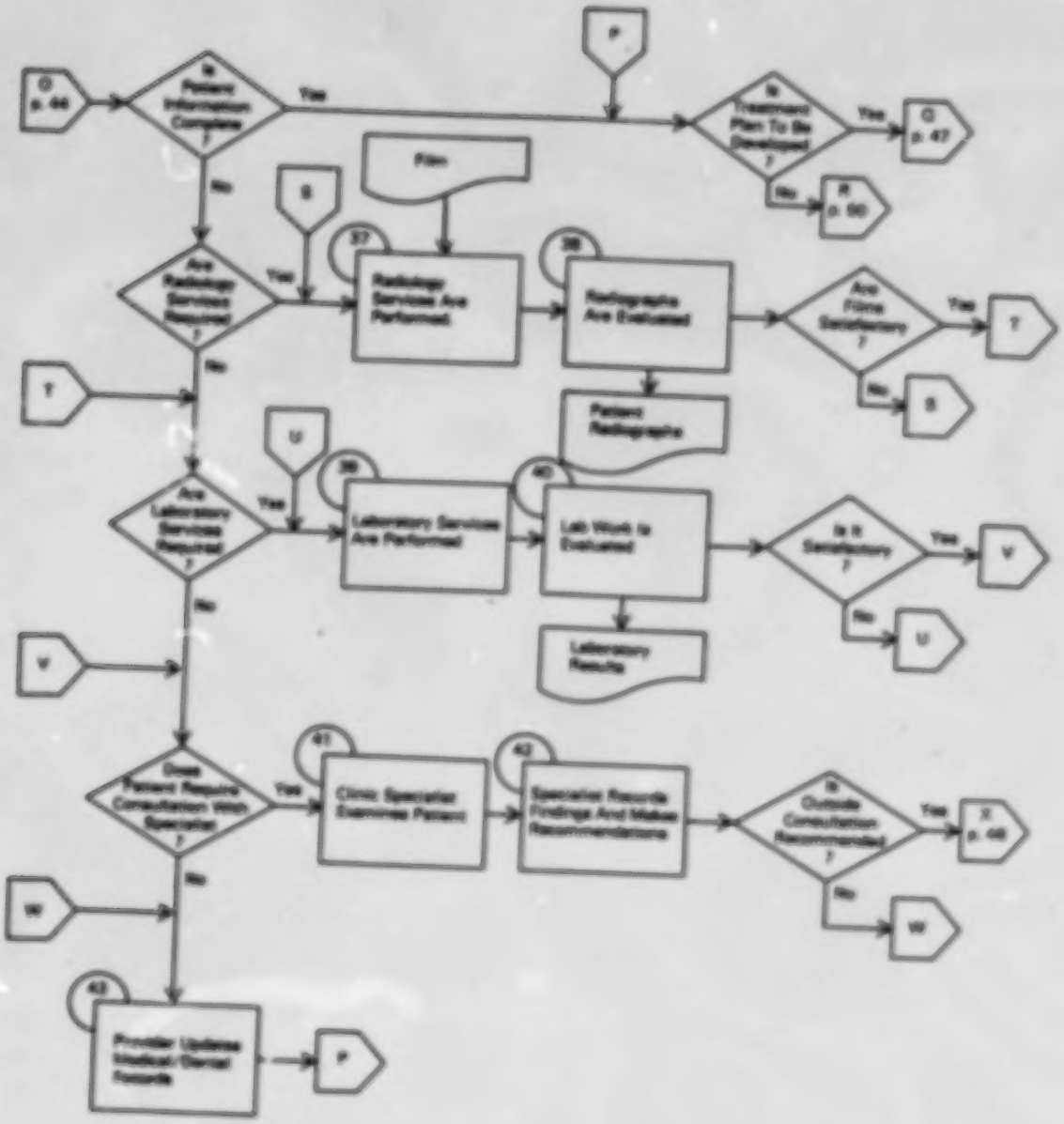

Enrolled Patient List
22
23
24
H p. 38
Provider Explains Scheduling Treatment Payment.
Provider Fills Out Forms.
Patient Is Added To Enrolled Patient List By Type Of Treatment Required.
Does Patient Require X-rays ?
Yes
J p. 41
No
K p. 41
Updated Enrolled Patient List

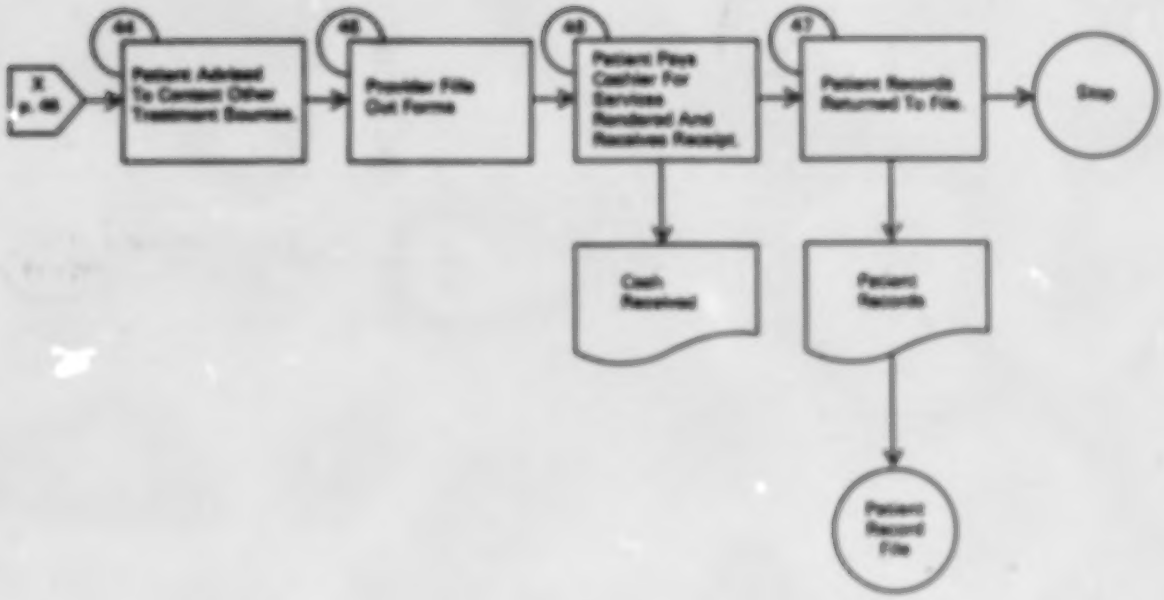

Radiographic Film
28
J
p. 40
Technician Makes Radiographs And Updates Forms.
28
Radiographs Developed And Evaluated
Are Films Satisfactory ?
Yes
K
p. 42
No
J

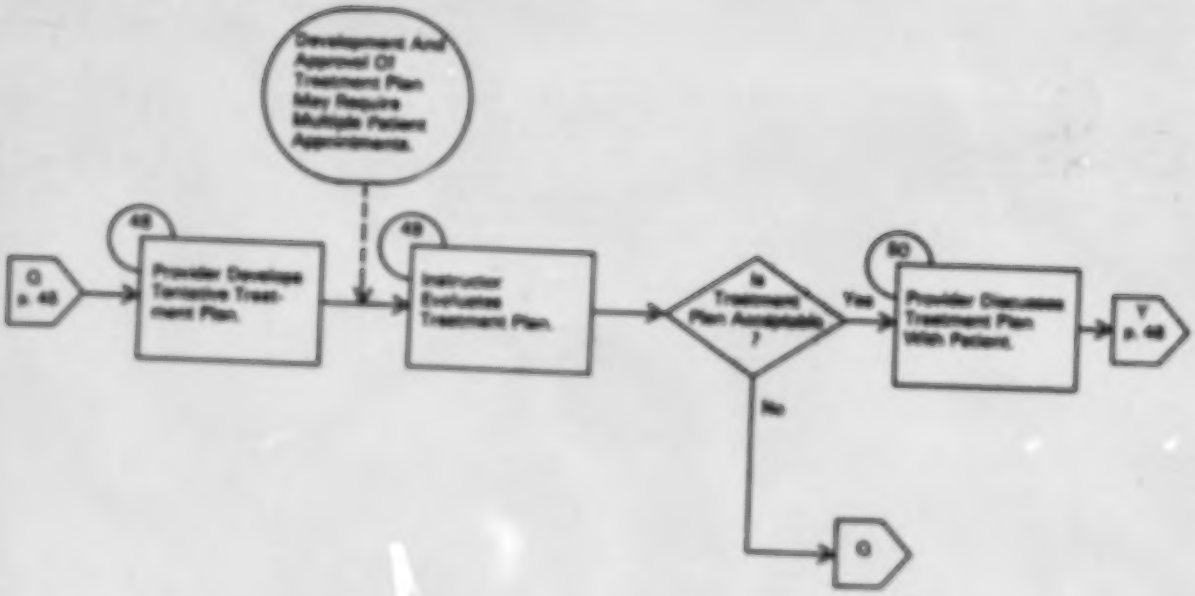

27
Patient Pays Cashier For Services Rendered And Receives Receipt.
K
p. 41
28
Patient Records Returned To File
L
p. 43
Cash Received
Patient Record
Patient Record File

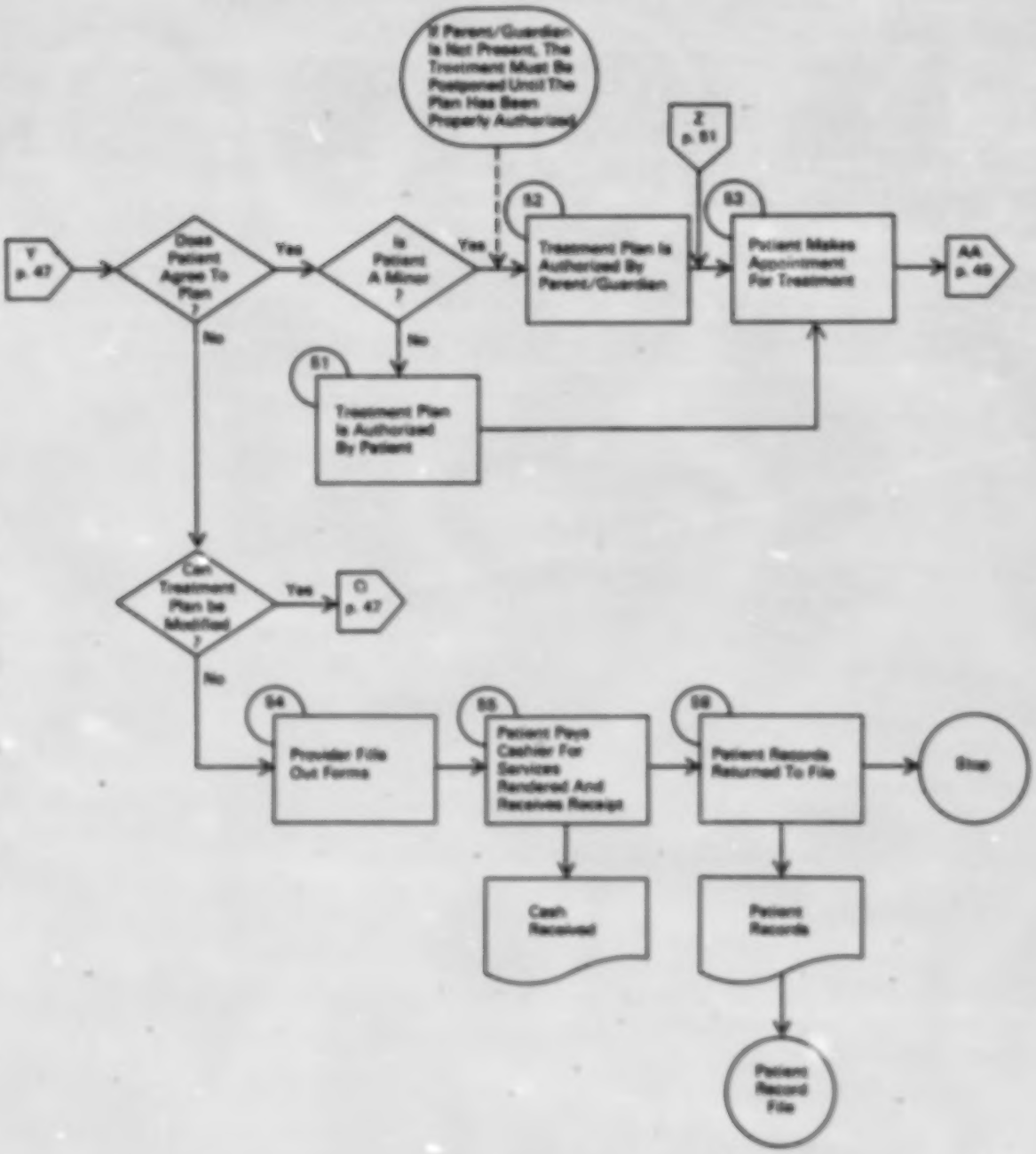

Patient Goes Home And May Be Contacted In Day/ Weeks
L p. 42
29
Patient Waits For Contact
M
Enrolled Patient List
List Of Student Needs
30
Patient Co-ordinator Checks Patient Requirements Of Students
Is Contact Delay Within Limit ?
Yes
No
Do Patient And Student Match ?
Yes
N p. 44
No
M
31
Drop Patient From List
Stop
Updated Enrolled Patient List

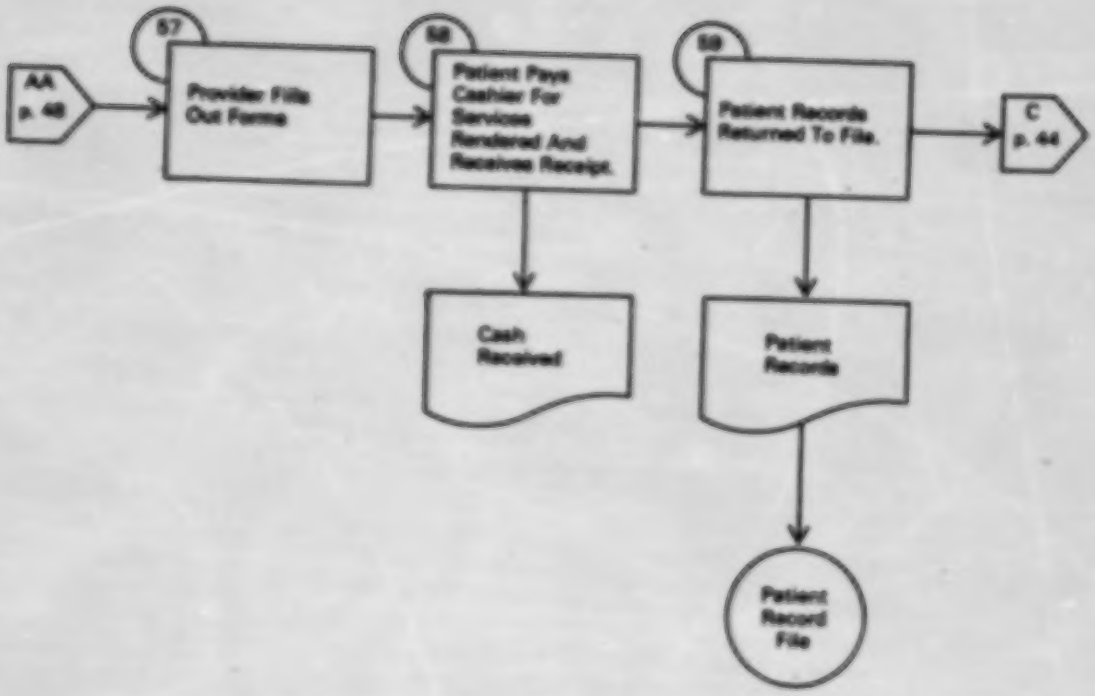

Patient Record File
Patient Records
Patient Records
C
p. 34
32
33
34
35
36
Student Is Notified Of Potential Patient.
Student Contacts Patient And Makes Appointment.
Patient Waits For Appointment With Provider
Patient Records Retrieved From File.
Patient And Records Are Examined By Student Provider.
B
p. 43
D
p. 45
Updated Enrolled Patient List
Updated List Of Student Needs

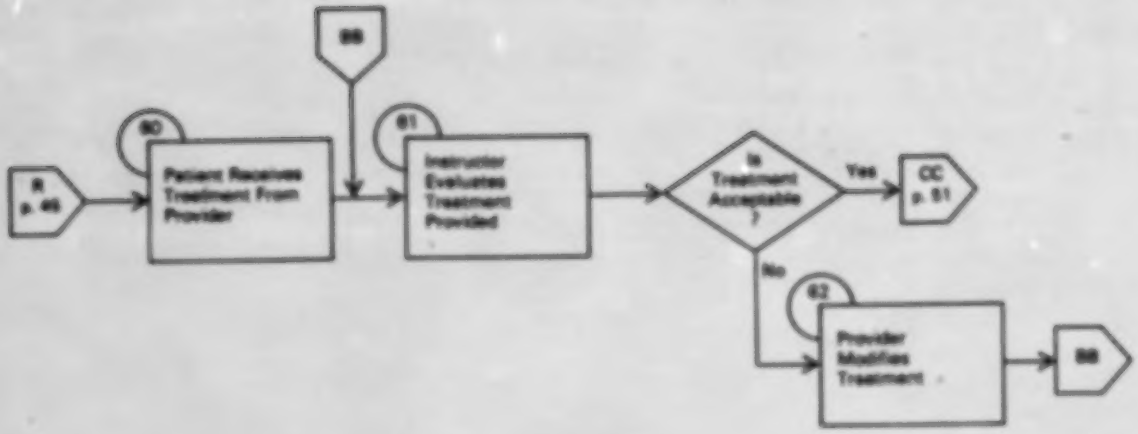


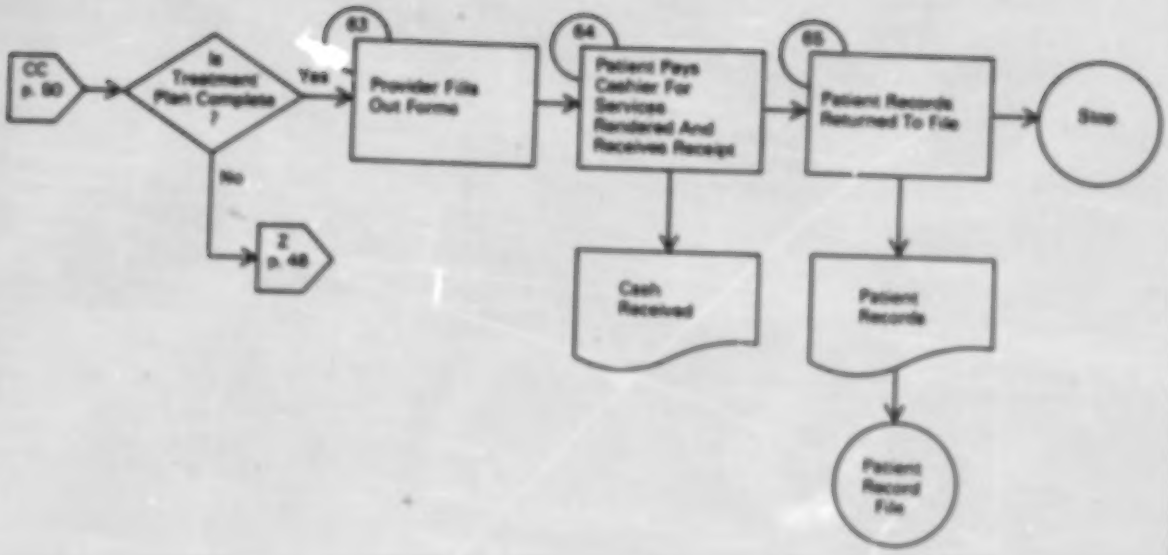



Development And Approval Of Treatment Plan May Require Multiple Person Appointments
Provider Develops Tentative Treatment Plan.
Instructor Explains Treatment Plan.
Is Treatment Plan Acceptable ?
Yes
No
Provider Discusses Treatment Plan With Patient.


If Parent/Guardian Is Not Present, The Treatment Must Be Postponed Until The Plan Has Been Properly Authorized
Z p. 51
V p. 47
Does Patient Agree To Plan ?
Yes
Is Patient A Minor ?
Yes
S2
Treatment Plan Is Authorized By Parent/Guardian
S3
Patient Makes Appointment For Treatment
AA p. 49
No
S1
Treatment Plan Is Authorized By Patient
No
Can Treatment Plan Be Modified ?
Yes
C p. 47
No
S4
Provider Fills Out Forms
S5
Patient Pays Cashier For Services Rendered And Receives Receipt
S6
Patient Records Returned To File
Stop
Cash Received
Patient Records
Patient Record File


AA
p. 48
57
Provider Fills Out Forms
58
Patient Pays Cashier For Services Rendered And Receives Receipt.
59
Patient Records Returned To File.
C
p. 44
Cash Received
Patient Records
Patient Record File


B
p. 45
80
Patient Receives Treatment From Provider
86
81
Instructor Evaluates Treatment Provided
Is Treatment Acceptable ?
Yes
CC
p. 81
No
82
Provider Modifies Treatment
86


CC
p. 50
Is Treatment Plan Complete ?
Yes
No
Z
p. 48
63
Provider Fills Out Forms
64
Patient Pays Cashier For Services Rendered And Receives Receipt
65
Patient Records Returned To File
Stop
Cash Received
Patient Records
Patient Record File

APPENDIX B

SAMPLES OF PATIENT RECORD FORMS

This appendix contains samples of data forms obtained from the three dental school clinics visited. The particular forms included in any given patient's record depend upon the dental needs and the status of the treatment plan, if one has been developed. Although this appendix includes only a sample of the forms collected by the project team, they are representative of the forms used by all three schools for similar purposes.

Initial Exam	Preliminary Treatment Plan	Final Treatment Plan
MEDICAL ALERT		
	Patient's no.	

Patient's name _____ Soc. Sec. No. _____

Home address _____ Home phone _____

Business address _____ Business phone _____

Name of ☐ Spouse ☐ Parent ☐ Guardian _____

Person to contact for appointments _____ Phone _____

Birthdate _____ Age _____ Sex: ☐ M ☐ F Race _____ ID no. _____

Place of birth _____ Age on arrival in _____

Occupation, type of work _____ ☐ Married ☐ Single ☐ Divorced ☐ Widow(er)

Recommended by (or social agency) _____

Responsibility for payments _____

Do you have dental insurance? ☐ Yes ☐ No Which company? _____

Reason for consultation _____

Student in Charge	Assign			Release		
	Date	Character	Signature	Date	Reason	Signature

Patient's name _____ Chart no. _____ Soc. Sec. No. _____

GUIDE TO A MEDICAL AND DENTAL HISTORY

Answers to the following questions are for our records only and will be considered confidential.

Directions

If your answer is yes to the question, put a circle around Yes.
If your answer is no to the question, put a circle around No.
Answer all questions and fill in blank spaces when indicated.

If you are filling out this form for another adult or child, please indicate your relationship to that adult or child.

Name _____ Relationship _____

1. Are you in good health? ..... Yes No
   Has there been any change in your general health within the past year? ..... Yes No
2. My last physical examination was on _____
   My last dental examination was on _____
   Were X rays taken at your last dental examination? ..... Yes No
3. Are you now under the care of a physician? ..... Yes No
   If so, what is the problem being treated? _____
   _____
4. The name and address of my physician is _____
   Phone no. _____ _____
5. Have you been hospitalized or had any serious illness or operation? ..... Yes No
   If so, what was the problem? _____
6. Do you have or have you had any of the following diseases or problems?
   a. Rheumatic fever or rheumatic heart disease ..... Yes No
   b. Congenital heart lesions ..... Yes No
   c. Cardiovascular disease (heart trouble, heart attack, coronary insufficiency, coronary occlusion, arteriosclerosis, stroke) ..... Yes No
      (1) Do you have pain in chest upon exertion? ..... Yes No
      (2) Are you ever short of breath after mild exercise? ..... Yes No
      (3) Do your ankles swell? ..... Yes No
      (4) Do you get short of breath when you lie down, or do you require extra pillows when you sleep? ..... Yes No
   d. Lung disease ..... Yes No
   e. Allergy ..... Yes No
   f. Asthma or hay fever ..... Yes No
   g. Hives or a skin rash ..... Yes No
   h. Fainting spells or seizures (epilepsy) ..... Yes No
   i. Diabetes ..... Yes No
      (1) Do you have to urinate (pass water) more than six times a day? ..... Yes No
      (2) Are you thirsty much of the time? ..... Yes No
      (3) Does your mouth frequently become dry? ..... Yes No
   j. Any other metabolic diseases ..... Yes No
      If so, name of disease(s) _____
   k. Hepatitis, jaundice, or liver disease ..... Yes No
   l. Arthritis (painful swollen joints) ..... Yes No
   m. Stomach ulcers ..... Yes No
   n. Kidney trouble ..... Yes No
   o. Tuberculosis ..... Yes No
   p. Do you have a persistent cough or cough up blood? ..... Yes No
   q. Sickle cell anemia ..... Yes No
   r. High blood pressure ..... Yes No
   s. Low blood pressure ..... Yes No

l. Venereal disease ..... Yes No
m. Other _____

7. Have you had abnormal bleeding associated with previous extractions, surgery, or trauma? ..... Yes No
   a. Do you bruise easily? ..... Yes No
   b. Have you ever required a blood transfusion? ..... Yes No
   If so, explain the circumstances _____

8. Do you have any blood disorder such as anemia (thin blood)? ..... Yes No
9. Do you have an implanted heart pacemaker or a prosthetic heart valve? ..... Yes No
10. Have you had surgery or X-ray treatments for a tumor, growth, or other condition of your mouth or lips or of any other part of the body? ..... Yes No
11. Are you taking any of the following?
   a. Antibiotics or sulfa drugs ..... Yes No
   b. Anticoagulants (blood thinners) ..... Yes No
   c. Medicine for high blood pressure ..... Yes No
   d. Cortisone (steroids) ..... Yes No
   e. Tranquilizers ..... Yes No
   f. Aspirin ..... Yes No
   g. Insulin, tolbutamide (Orinase), or similar drug ..... Yes No
   h. Digitalis or drugs for heart trouble ..... Yes No
   i. Nitroglycerin ..... Yes No
   j. Other _____
12. Have you ever had a problem taking any of the following?
   a. Local anesthetics ..... Yes No
   b. Penicillin or other antibiotics ..... Yes No
   c. Sulfa drugs ..... Yes No
   d. Barbiturates, sedatives, or sleeping pills ..... Yes No
   e. Aspirin ..... Yes No
   f. Iodine ..... Yes No
   g. Other _____

Women

13. Are you pregnant? ..... Yes No
14. Do you have any problems associated with your menstrual period? ..... Yes No
15. Are you taking birth control pills? ..... Yes No
   If so, what kind (brand)? _____

Children under 12

16. Has your child had any of the following?
   a. Scarlet fever ..... Yes No
   b. Measles ..... Yes No
   c. Mumps ..... Yes No
   d. Chicken pox ..... Yes No
   e. German measles ..... Yes No
   f. 3-day or common measles ..... Yes No
   g. Tuberculosis ..... Yes No
   h. Leukemia ..... Yes No
   i. Anemia (thin blood) ..... Yes No
   j. Fever of unknown origin ..... Yes No
   k. Upper respiratory infection ..... Yes No
   l. Ear infections ..... Yes No
   m. Other _____
17. Has your child had any serious accidents or falls? ..... Yes No
   If so, please explain _____
18. Does your child have any learning difficulties? ..... Yes No
19. Is your child enrolled in a special school or in special classes? ..... Yes No

Dental History

20. Are you having dental pain?	Yes	No
21. Does food pack between your teeth?	Yes	No
22. Do your gums bleed when you brush your teeth?	Yes	No
23. Have you ever been treated for periodontal disease (pyorrhea)?	Yes	No
24. Have you ever been instructed on proper home care of your teeth?	Yes	No
25. Do you have sensitive teeth?	Yes	No
26. Do you grind your teeth during the night?	Yes	No
27. Do you have any pain in or near your ears?	Yes	No
28. Do you have difficulty in opening your mouth wide?	Yes	No
29. Have you ever had any injury to your face or jaws?	Yes	No
30. Do you now have or have you ever had sinus trouble?	Yes	No
31. Have you ever had problems with your tonsils or adenoids or had them removed?	Yes	No
32. Have you ever had sores in your mouth or on the lips that are slow to heal or that heal and reappear?	Yes	No
33. Do you want to keep your teeth?	Yes	No
34. Do you think that your teeth are affecting your general health in any way?	Yes	No
35. Do you have difficulty in chewing your food?	Yes	No
36. Are you dissatisfied with the appearance of your teeth?	Yes	No
37. Are you worried about receiving dental treatment?	Yes	No
38. Do you have any disease, condition, or problem not listed in the above medical and dental history?	Yes	No

If so, please explain _____

_____

LABORATORY RESULTS

RADIOGRAPHIC EXAMINATION

Caries _____ Routine _____ Extensive
Endodontic _____ Periapical radiolucency
_____ Widened apical PDM

Pathology (describe)

_____

Periodontal
_____ Slight bone loss
_____ Moderate bone loss
_____ Severe bone loss
_____ Localized _____ Generalized

DENTAL EVALUATION

Jaw Relationships
____ Class I ____ Class II ____ Class III
Vertical overlap (overbite) _____
Horizontal overlap (overjet) _____

TMJ ____ Symptomatic ____ Asymptomatic

Gingiva

____ Normal ____ Inflamed
____ Localized ____ Generalized

Pocketing

____ Mild ____ Moderate ____ Severe
____ Localized ____ Generalized

Teeth

____ Caries ____ Abrasion ____ Mottled
____ Missing ____ Mobility ____ Malposed
____ Rotated ____ Malocclusion
____ Infraerupted ____ Supraerupted
____ Diastemas ____ Occlusal prematurities

Edentulous Ridge
____ Well-formed
____ Irregular
____ Knife-edged
____ Difficult or special case

Previous Denture Experience
____ Satisfactory ____ Unsatisfactory

Anomalies of Hard Tissue

In number _____
_____
In color _____
_____
In calcification _____
_____
In morphology _____
_____
In position _____
_____
In eruption _____
_____

Examination comments _____
_____
_____
_____
_____

Teeth needing immediate attention (teeth, procedure needed, reason) _____
_____
_____
_____
_____
_____

Patient's name _____ Chart no _____ Soc. Sec. No _____

Age _____ Sex: ☐M ☐F Race _____ Exam date _____
Student examiner _____

Chief complaint or reason for consultation _____

MEDICAL HISTORY: SUMMARY

Blood pressure _____/_____
General health _____
Existing illness _____
Medicines/drugs _____
Allergies _____

☐ Previous anesthesia uneventful
☐ History of excessive bleeding
☐ No previous anesthesia
☐ Other complications

Describe all medications and any positive findings in *Medical History* _____

SOFT TISSUE EXAMINATION

	N=normal	P=pathology
_____ Lips	_____ Soft palate	_____ Tongue
_____ Buccal mucosa	_____ Tonsils	_____ Sublingual area
_____ Hard palate	_____ Pharynx	_____ Lymph nodes

Describe *all* positive findings _____

ORAL HYGIENE AND INDICES

Plaque
____ Heavy ____ Medium ____ Light

Supragingival Calculus
____ Heavy ____ Medium ____ Light
____ Localized ____ Generalized

Subgingival Calculus
____ Heavy ____ Medium ____ Light
____ Localized ____ Generalized

DMF:T _____ def.t _____

DMF:S _____ def.s _____

Caries Rate
____ Low ____ High ____ Increased

Prosthesis
____ Present ____ Absent
____ Being placed
____ Not being considered

PULPAL EVALUATION

| Tooth No. | | |

Patient's name _____ Chart # _____ Soc. Sec. No. _____

GENERAL PHYSICAL CONDITIONS

Weight _____ Height _____ Posture: _____ Good _____ Poor

Physique: _____ Slight _____ Average _____ Heavy

RADIOGRAPHIC EVALUATION

EXAMINATION CHART

Caries Survey

Incipient Caries — R _____ | _____ L

Root Caries — R _____ | _____ L

Advanced Caries — R _____ | _____ L

Periodontal Survey

Horizontal Bone Loss
_____ Localized _____ Generalized
Areas _____

Vertical Bone Defects
_____ Localized _____ Generalized
Areas _____

Furcation Involvements
R _____ | _____ L

Periapical Widening
R _____ | _____ L

Lamina Dura
Normal ____ Widened ____ Absent ____
R _____ | _____ L

Root Anatomy
___ Short ___ Average ___ Long
___ Broad ___ Narrow ___ Spindle-shaped

Tooth Development
___ Normal ___ Accelerated ___ Delayed

Trabeculation Pattern
___ Dense ___ Average ___ Sparse
___ Regular ___ Irregular

Radiographic Abnormalities _____

_____

_____

_____

_____

ORAL FACIAL COMPLEX

Facial Esthetics
___ Good ___ Fair ___ Poor
___ Delicate ___ Strong

Facial Form
___ Square ___ Ovoid ___ Tapering
___ Symmetrical ___ Asymmetrical
___ Dominant right ___ Dominant left

Soft Tissue Profile
___ Convex ___ Straight ___ Concave
___ Retro. ___ Meso. ___ Prog.

Muscles of Mastication
___ Heavy ___ Medium ___ Thin
___ Normal ___ Hypertonic ___ Hypotonic

Lips
___ Long ___ Normal ___ Short
___ Thick ___ Thin
___ Relaxed ___ Active

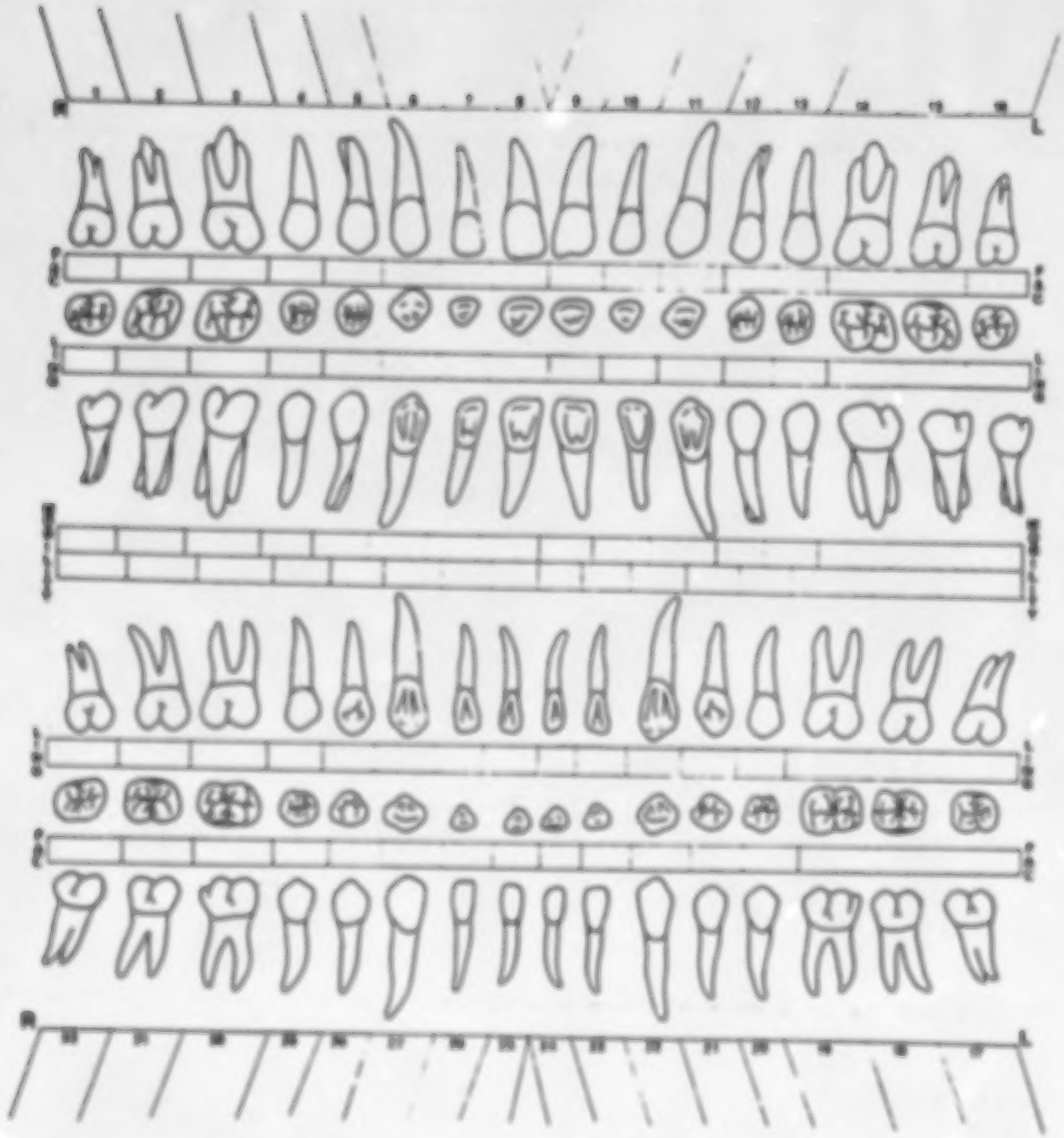
Protrusion ___ Upper ___ Lower

Eversion ___ Upper ___ Lower

Lip Line at Rest
___ High ___ Low ___ Normal
___ Together ___ Apart

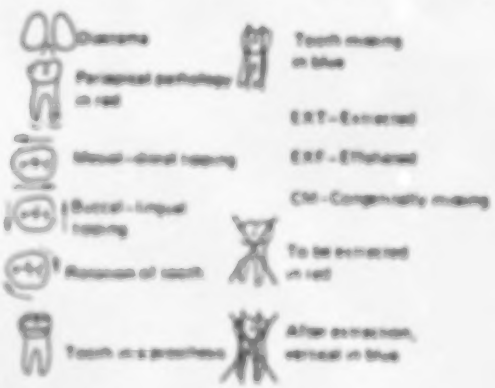
Lips in Function
___ High ___ Low ___ Normal
___ Active ___ Relaxed

ADULT EXAMINATION CHART



Pathology in Red – Restorations in Blue

AM	– Amalgam	AJC	– Acrylic jacket
COM	– Composite	PJC	– Porcelain jacket
SIL	– Silicate	¾ GC	– ¾ gold crown
CEM	– Cement	FGC	– Full gold crown
GI	– Gold inlay	PLM	– Plastic to metal
GI	– Gold foil	POM	– Porcelain to metal
PD	– Partial denture	BR	– Fixed bridge
FD	– Full denture	SSC	– Stainless steel crown



GINGIVAL EVALUATION

Color
___ Pink ___ Red ___ Blue
___ Localized ___ Generalized
Area _____

Contour
___ Normal ___ Swollen ___ Blunted
___ Localized ___ Generalized
Area _____

Texture
___ Smooth ___ Stippled
___ Localized ___ Generalized
Area _____

Consistency
___ Soft ___ Firm
___ Localized ___ Generalized
Area _____

Inflammation
___ Mild ___ Moderate ___ Severe
___ Localized ___ Generalized

Exudate
___ Purulent ___ Bloody
___ Localized ___ Generalized

Gingival Recession
___ Localized ___ Generalized
Area _____

Attached Gingiva
___ Present ___ Absent
Area _____

A.N.U.G.
___ Past history
___ Present ___ Absent

OCCLUSAL EXAMINATION

Skeletal Classification
___ Ortho. ___ Retro. ___ Prog.

Molar Relationship (Angle)
Right ___ Cls. I ___ Cls. II ___ Cls. III ___ Edge to Edge
Left ___ Cls. I ___ Cls. II ___ Cls. III ___ Edge to Edge

Cuspid Relationship
Right ___ Cls. I ___ Cls. II ___ Cls. III ___ Edge to Edge
Left ___ Cls. I ___ Cls. II ___ Cls. III ___ Edge to Edge

Type of Occlusion
Right ___ Cuspid rise ___ Group function
___ Bilateral balance
Left ___ Cuspid rise ___ Group function
___ Bilateral balance

Centric Prematurities and Eccentric Contacts

a. Centric Relation

R _____ | _____ L

c. Right Lateral

R _____ | _____ L

e. Right Balancing

R _____ | _____ L

Overbite _____ **Overjet CR** ___/ **CO** _____

Centric Slide _____
___ None ___ Straight ___ Right ___ Left

Crossbite Teeth

R _____ | _____ L

Teeth in Lingual Version

R _____ | _____ L

Incisal Guidance
___ Steep ___ Average ___ Shallow ___ Flat

Plane of Occlusion
A-P ___ Flat ___ Curved ___ Steep
Lat ___ Even ___ Lower right ___ Lower left
Level ___ Even ___ Broken

b. Protrusive

R _____ | _____ L

d. Left Lateral

R _____ | _____ L

f. Left Balancing

R _____ | _____ L

OCCLUSAL EXAMINATION (continued)

Wear Facets

R _____ L ____ Normal ____ Abnormal
____ Sharp edge ____ Round edge

Abnormal Marginal Ridge

R _____ L

Open or Abnormal Prox. Contacts

R _____ L

Restorations Contributing to Disease

R _____ L

Openbite

____ Anterior ____ Posterior
____ Mild ____ Moderate ____ Severe

Crowding

R _____ L

Diastemas

R _____ L

Tilted Teeth

R _____ L

EDENTULOUS RIDGE EVALUATION

Size of Mouth Opening
____ Constricted ____ Normal ____ Wide

Tuberosities
____ Thin ____ Large ____ Bulbous

Tori
____ Maxillary ____ Mandibular

Undercuts
____ Anterior ____ Right posterior
____ Left posterior

Vestibules
____ Deep ____ Shallow
____ Resistant ____ Displaceable

Frenula
____ High ____ Low ____ Interfering
Areas _____

Saliva
____ Abundant ____ Normal ____ Dry
____ Thin ____ Viscous

Interridge Distance
____ Small ____ Average ____ Large

Arch Form
____ Ovoid
____ Tapering (a-shaped)
____ Square (u-shaped)

Ridge Form
____ U-shaped ____ V-shaped
____ Bulbous ____ Knife-edged
____ Flat ____ Depressed

Vault Form
____ U-shaped ____ Curved
____ V-shaped ____ Flat

Oral Mucosa
____ Thin ____ Average ____ Thick
____ Fibrous ____ Hyperplastic

Buccal Space
____ Wide ____ Narrow
____ High ____ Average

Tongue
____ Large ____ Small
____ Broad ____ Narrow
____ Active ____ Relaxed

Throat Form
____ Class I ____ Class II ____ Class III

PARAFUNCTIONAL HABITS EVALUATION

Tooth Habits
___ Bruxing
___ Clenching
___ Doodling

Foreign Object
___ Pipe smoking
___ Nail biting
___ Finger habits
___ Other _____
___ Occupational (e.g., sandblaster, acid worker)

Malfunctional
___ Lip biting
___ Cheek biting
___ Mouth breathing
___ Tongue habits
___ Anterior tongue thrust
___ Lateral tongue thrust
___ Right ___ Left
___ Mentalis habit

TMJ EVALUATION

Crepitus
___ Right ___ Left

Clicking
___ Right ___ Left

Deviation
Opening ___ Right ___ Left
Closing ___ Right ___ Left

Pain
Temporal ___ Right ___ Left
Earaches ___ Right ___ Left
Sore teeth ___ Right ___ Left
Muscles ___ Right ___ Left

TREATMENT READINESS EVALUATION

Patient's Attitude to Dental Needs
___ Enthusiastic ___ Indifferent ___ Negative
___ Anxious ___ Calm ___ Critical

Patient's Personality
___ Introverted ___ Extroverted
___ Shy ___ Fearful
___ Excited ___ Calm ___ Critical

Patient's Motivation
___ Pain ___ Fear ___ Concern
___ Indifference ___ Necessary evil
___ Positive desire

Behavior in Chair
___ Calm ___ Nervous
___ Aware ___ Dazed
___ Fearful ___ Anxious ___ Positive
___ Hysterical ___ Hostile ___ Overindulged

Previous Dental Experience
___ Positive ___ Negative
___ Pain ___ Difficulties
Comments _____

Previous Prosthesis Experience
___ Positive ___ Negative
___ Antagonistic ___ Critical

(child patient only)

Treatment tolerance span _____ minutes

Mental Age

_____ Normal _____ Subnormal
Age Level

Separation Anxiety
___ Mild ___ Moderate ___ Severe

Parent/Child Relationship in Waiting Room

_____ Dependent _____ Transitional

_____ Independent

DIAGNOSIS

Overall Diagnosis

Treatment Prognosis

DENTAL CONSULTATIONS

Consultations		
Required		*Obtained*
Operative		
PPP		
Prosthodontics		
Periodontics		
Endodontics		
Pedodontia		
Oral surgery		
Radiology		
Orthodontics		

List all findings (please print: include date of consultation, department, and signature)

I, the undersigned, _____ have had the
(Name of Patient, Parent, or Guardian)

treatment plan for _____ explained to me.
(Patient)

The risks involved with those procedures, alternatives to those procedures and risks therein involved, and the risks of no treatment have also been explained to me and I understand the explanations. I have been given an opportunity to ask questions and have those questions answered.

Based upon this explanation, I have agreed that _____ be treated
(Patient)

at the College of Dentistry, a teaching institution operated by the Board of Trustees of the , according to the treatment plan and:

a. Authorize the administration of local anesthetics and or nitrous oxide oxygen analgesia deemed necessary for the performance of the above procedures;

b. Authorize the taking of any records, X rays, or photographs as is deemed necessary in the treatment and the use of such records, X rays, or photographs by the College of Dentistry or faculty for the purpose of illustration or publication in professional journals or for the advancement of teaching. I have been informed that my identity will be protected at all times.

Patient's name _____ _____
Signature of Patient, Parent, or Guardian

Date _____ Relationship _____

Witness _____

••••••••••

I agree to the following change in the treatment plan _____

_____

_____

Patient's name _____ _____
Signature of Patient, Parent, or Guardian

Date _____ Relationship _____

Witness _____

••••••••••

I agree to the following change in the treatment plan _____

_____

_____

Patient's name _____ _____
Signature of Patient, Parent, or Guardian

Date _____ Relationship _____

Witness _____

••••••••••

I agree to the following change in the treatment plan _____

_____

_____

Patient's name _____ _____
Signature of Patient, Parent, or Guardian

Date _____ Relationship _____

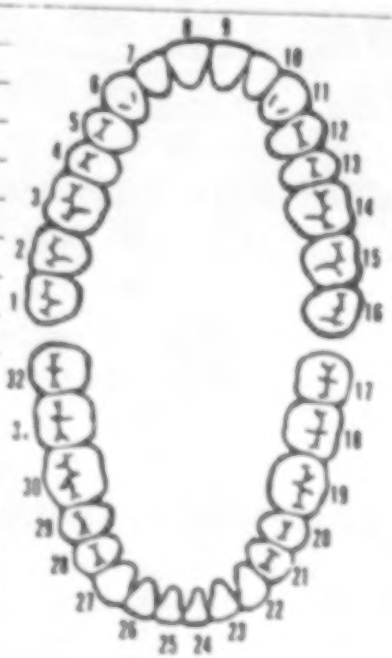
Witness _____

••••••••••

PRELIMINARY TREATMENT PLAN

Item No.	Procedure	Item No.	Procedure	Item No.	Procedure

Remarks



FINAL TREATMENT PLAN

Item No.	Procedure	Estimated Fee		Date Started	Date Finished

DAILY TREATMENT RECORD

DATE	DEPT	TOOTH NO	PROFESSIONAL SERVICE	NEXT APPOINTMENT	STUDENT	INSTRUCTOR

PAYMENTS

Date	Dept. Code / Procedure	Charge		Credit/ Payment		Balance		Cashier

APPENDIX C

SUPPORTING DATA

This appendix contains material obtained during the site visits that supports and amplifies discussions in the body of the report.

RANGE OF FEES FOR VARIOUS SERVICES CHARGED AT THREE DENTAL SCHOOL DENTAL DELIVERY SYSTEMS

Service	Fee Range
ORAL DIAGNOSIS	
Emergency Oral Examination	$ 3-7
Full Mouth X-ray	8-10
RESTORATIVE	
Amalgam Surface	5-8
Gold Inlay Surface	14 [plus cost of gold] - 30
PROSTHODONTICS	
Dentures - Upper	70-125
Dentures - Lower	70-125
ORAL SURGERY	
Single Tooth Extraction	5-6
Biopsy	10-17
PERIODONTICS	
Gingivectomy	15-30
ENDODONTICS	
Root Canal Anterior	30-45
ORTHODONTICS	
Active Lingual Arch	20-60 (two schools)
Complete Treatment	650 (one school)
PEDIATRIC	
Steel Crown	10-15

81

BIBLIOGRAPHY

American Dental Association, "All Aboard for Union City!", *Contact Print*, Winter 1974, Vol. 52#1, BLS Package Library, Chicago, Illinois.

American Dental Association, *Annual Report - Dental Education*, 1973/74.

American Dental Association, "Are You Ready for a New Kind of Clinic?", *Dental Student* Vol. 52, April 1974, BLS Package Library, Chicago, Illinois.

American Dental Association, "Quality, Not Low Fees, Attracts Dental School Patients," BLS Package Library, Chicago, Illinois.

American Dental Association, "USC's Dental Ambassadors," *Dental Survey* Vol. 50, November 1974, BLS Package Library, Chicago, Illinois.

Angerbauer, K., Ake, J., Excerpt from *Health Resources Statistics*, Chapter 8 "Dentistry and Allied Services," U.S. Department of Health, Education, and Welfare, 1972-73.

Anon., "Making Dental Care Available to the People In Between: Council on Dental Health," *Journal of the American Dental Association* 89(4):906-8, October 1974.

Anon., "Reaching into the Community - Oral Cancer Screening by the School of Dental Medicine," *Tufts Health Science Review* 4(1):22-4, Spring-Summer 1974.

Anon., "Toronto Students Bring Dentistry to the Community and Find Interesting Results," *Dental Student News for Dental Educators* 2 and 5, April 1972.

Bissell, G. D., "Student Participation in Community Dental Health Programs: The Experience at SUNY at Buffalo," *Journal of Dental Education* 39(8):517-21, August 1975.

Branch, Sr., R. G., Platt, L. A., Johnson, G. E., "Effects of Patient Contact Upon First-Year Dental Students: A Study of Changing Perceptions," *Sociological Abstracts* 10, No. 7894, Supplement 13, February-April 1971.

Branch, R. C., Platt, L. A., "The Effect of Early Clinic Experience Upon Dental Students: A Study of Professional Role Adoption," *Sociological Abstracts* 20, No. F5568, May 1972.

Chambers, D. W., "University of North Carolina School of Dentistry — Technical Reports on Evaluation," Technical Report #2, *Manual for the Automatic Scoring of Fernandez's Total Patient Care Attitude Inventory*, December 1970.

Davis, H. C., Palmer, J. D., "The Dental Student in the Community," *British Dental Journal* 137(5):191-3, September 3, 1974.

Douglas, Bruce L. and Cohen, Lawrence, "The Teaching Patient Population in Dental Education," *Inquiry: A Review of Current Research in Hospital and Medical Economics*, Blue Cross Association, Chicago, March 1973, pp. 33-41.

Douglass, C. W., Lindahl, R. L., Gillings, D. B., Moore, S., "Laboratory Model of Private Practice: Method of Studying New Systems of Health Care Delivery in Dental Schools," *Journal of Dental Education* 37(12): 8-14, December 1973.

Drake, Claude W., "Community Dentistry: Student Attitudes and Priorities," *Journal of Dental Education* 37, 49-54, July 1973.

Dummett, C. O., "Dentistry in Regional Medical Programs: Need for Greater Involvement," *American Journal of Public Health* 65(5):465-8, May 1975.

———. "Extramural Programs in Community Dentistry," *Journal of the American College of Dentists* 41(4):264-8, October 1974.

Feldstein, Paul J., *Financing Dental Care: An Economic Analysis*, D. C. Heath and Co., Lexington, Massachusetts, 1973.

Fredericks, Marcel A., Mundy, Paul, Lennon, John J., "The Student Dentist and the Poor," *Journal of the American College of Dentists* 39, 84-93 and 105, April 1972.

Freed, J. R., "Educational Value of a University-Sponsored Community Dental Clinic: A Three Year Student Evaluation," *Journal of Dental Education* 40(2):93-8, February 1976.

Gardiner, J. F., Lotzkar, S., "A Survey of Extramural Experiences for Dental Students," *Journal of Dental Education* 39(8):530-4, August 1975.

Georgio, P. J., "Milwaukee School Reaches Out," *Dental Student* 53(5):26-7, February 1975.

Gonzales, L., Silverstein, S. J., "Make the Dental Clinic

'A Nice Place to Visit'," *Dental Student* Vol. 51, January 1973, American Dental Association, BLS Package Library, Chicago, Illinois.

Hammons, P. E., Jamison, H. C., Wilson, L. L., "Quality of Service Provided by Dental Therapists in an Experimental Program at the University of Alabama," *Journal of the American Dental Association* 82:1060-3, May 1971.

Horton, P. S., Soule, D. J., Cavanaugh, C. T., "Procurement of Teaching Patients: Cooperative Effort Between Social Service Agencies and Dental School," *Journal of Dental Education* 37(11):41-2, November 1973.

Jenny, J., Frazier, P. J., "Departments of Community Dentistry as Viewed by Teachers of Clinical Practice, Basic Science, and Community Dentistry," *Journal of Public Health Dentistry* 34(3):161-73, Summer 1974.

Konigsberg, I., "The Special Patient," *Texas Dental Journal* Vol. 94, April 1976, American Dental Association, BLS Package Library, Chicago, Illinois.

Kress, G. C., Ferraro, E., Still, R., "Patients' Evaluation of the Outpatient Services in a School of Dental Medicine," *Journal of Public Health Dentistry* Vol. 33, Spring 1973.

Kurtzman, C., Freed, J. R., Goldstein, C. M., "Evaluation of Treatment Provided Through Two Universities' Mobile Dental Project," *Journal of Public Health Dentistry* Vol. 34, Spring 1974.

Lindahl, R. L. "Responsibility of Dental Schools for New Systems of Health Care Delivery," *Journal of Dental Education* Vol. 36, July 1972.

Littleton, Jr., P. A., Petterson, E. O., "Trends in the Development of Teaching Preventive and Community Dentistry in Dental Schools of the United States," *Proceedings of the Third Conference on the Teaching of Preventive Dentistry and Community Health*, The New England Center for Continuing Education, Durham, New Hampshire, 47-68, May 11-13, 1970.

Litwinionek, B., "The Opinion of Patients Treated by Stomatology Students," *Czasopismo Stomatologiczne* 27(8):863-7, August 1974, (in Polish with an English summary), National Library of Medicine Call No. W1CZ143.

Loupe, M., Meskin, L., Kenney, J., "Changing Student Attitudes with Community Programs," paper read before the 50th General Meeting of the International Association for Dental Research, Las Vegas, Nevada, *IADR Programs and Abstracts* No. 97, March 23-26, 1972.

Lutz, B. L., Lewis, G. P., "The Dental College as a Health Maintenance Organization," *Journal of Dental Education* 28(7):380-4, July 1974.

Mike, L. H., "Area Health Education Centers: What Are They and Where Are They Going?", *Journal of Dental Education* 50(3):242-51, March 1975.

Newman, John F., Anderson, Odin W., *Patterns of Dental Service Utilization in the United States: A Nationwide Social Survey*, Center for Health Administration Studies, University of Chicago, Research Series 30, 1972.

Pelton, W. J., "Dental Health Program of the University of Alabama in Birmingham: IX. A Summary of Seven Years' Experience," *American Journal of Public Health* 62, 671-675, May 1972.

Petterson, E. O., "Teaching Public Health to Dental Students," *Journal of Public Health Dentistry* 34(4): 258-71, Fall 1974.

_____, "Background Information - 1969 Survey on the Undergraduate Programs in Preventive and Community Dentistry," *Proceedings of the Third Conference on the Teaching of Preventive Dentistry and Community Health*, The New England Center for Continuing Education, Durham, New Hampshire, 178-185, May 11-13, 1970.

_____, "Community Health - A Dental School Affair," *Journal of the American College of Dentists* 38, 229-241, October 1971.

_____, "Educational Innovation Through Organization Change: The Introduction of Separate Administrative Units of Preventive and Community Dentistry at Schools of Dentistry in the United States," *Proceedings of the Third Conference on the Teaching of Preventive Dentistry and Community Health*, the New England Center for Continuing Education, Durham, New Hampshire, 186-205, May 11-13, 1970.

Petterson, E. O., Shea, N., "Interaction of Dental Students with the Educational Environments Provided by Preventive and Community Dentistry: Realism and Reasonableness of the Educational Planning and Implementation," *Journal of Public Health Dentistry* 32, 1-11, Winter 1972.

Petterson, E. O., Littleton, P. A., "Preventive and Community Dentistry in the Dental Schools of the United States," *Journal of Public Health Dentistry* 31, 256-267, Fall 1971.

_____, "Teaching Departments of Community Dentistry in the United States of America," *British Dental Journal* 133, 193-197, September 5, 1972.

Ramirez, A., Cameron, B. G., Fiorella, J. H., "An Evaluation of the Dental Assistant Utilization Program at the University of Alabama School of Dentistry," *Journal of Public Health Dentistry* 32, 100-109, Spring 1972.

Robinson, E., Bagramian, R. A., "The Community Practice Program at the University of Michigan, Ann Arbor, USA," *Community Dentistry Oral Epidemiology* 2(6):269-72, 1974.

Shapiro, Stewart, "Comparability of a Dental School Clinic Population to National Survey Data: Elderly Patients," *Journal of Baltimore College of Dental Surgery* 26, 2-4, July 1971. Also cited in *Oral Research Abstracts* 7, No. 6006, October 1972.

Soty, N. L., Henderson, W. G., "A Comparative Study of Patient Evaluations of Dental Treatment Per-

formed by Dental and Expanded-Function Dental Hygiene Students," *Journal of the American Dental Association* 88(5):985-96, May 1974.

Smith, M. L., "An Example of Student Involvement in Community Dental Health," American Dental Association, BLS Package Library, Chicago, Illinois.

Smith, Wayne E., "Computer Method for Assigning Patients to Students in a Dental Clinic," *Journal of Dental Education* Vol. 33, No. 4, 416-23.

Soule, D. J., Horton, P. S., Steinhauer, A. D., "Why Patients Select Dental Schools for Treatment: Effects of Fee Structure and Student Appearance," *Journal of Dental Education* 38(11):638-41, November 1974.

Speed, Edwin M., Wolff, Albert, Barr, John H., "A Survey of Intramural Dental Practices in United States Dental Schools," *Journal of Dental Education* 37, 26-19, January 1973.

Stewart, A. V., Wolf, M. C., Rosenstein, D. I., "Community Dentistry at Fairleigh Dickinson University," *Journal of the New Jersey Dental Association* 44(2): 18-9, Passim, Winter 1973.

Stewart, A. V., Wolf, M. C., "Evaluation of Student Involvement in Community and Preventive Dentistry Programs," *Journal of Dental Education* 37(8):49-52, August 1973.

Task Force on National Health Programs of the American Dental Association, "Dentistry in National Health Programs: Reports of the Special Committees," American Dental Association, Chicago, October 1971.

Turner, G., "Organization in the School Dental Service," American Dental Association, BLS Package Library, Chicago, Illinois.

U.S. Department of Health, Education, and Welfare, *Dentistry and Allied Services*, 1975-76, Manpower Analysis Branch, Division of Dentistry.

U.S. Department of Health, Education, and Welfare, "Summary Proceedings, Projecting Dental Manpower Requirements: Productivity and Demand Indices Advisory Workshop," December 12 & 13, 1973, Manpower Development Branch, Division of Dental Health.

Vig, R. G., "Whiteriver, Arizona, Satellite Clinic of the UCLA School of Dentistry — A Three-Year Report," American Dental Association, BLS Package Library, Chicago, Illinois.

Waldman, H. B., "The Performance of Community Oriented Activities by Specialist and Generalist Dental Practitioners," *Journal of the American College of Dentists* 38, 173-179, July 1971.

Weinstein, P., Smith, T. A., Bartlett, R. C., "A Study of the Dental Student-Patient Relationship," *Journal of Dental Research* 52(6):1287-92, November-December 1973.

Zucker, S. B., Cheney, H. G., Fishman, S. R., Depaola, D. P., "Dental Students Conduct Preventive Dentistry Programs," *Virginia Dental Journal* 35-6, October 1975.